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HYSTERIA AND EPILEPSY

BY J. LEONARD CORNING, M.D.

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A TREATISE ON

HYSTERIA AND EPILEPSY,

WITH

SOME CONCLUDING OBSERVATIONS ON

EPILEPTIC INSOMNIA,

BY

J. LEONARD CORNING, M. A., M. D.,

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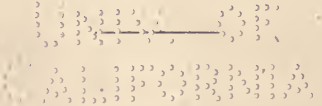
Author of "A Treatise on Headache and Neuralgia," "Brain Rest, being a Disquisition on the Curative Properties of Prolonged Sleep," "Local Anæsthesia," "Brain Exhaustion, with Some Preliminary Considerations on Cerebral Dynamics," "Carotid Compression," etc.



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TO THE MEMORY OF MY MATERNAL GRANDFATHER,

FREDERICK DEMING,

THESE PAGES ARE INSCRIBED AS A SLIGHT TOKEN OF
AFFECTION AND ADMIRATION FOR HIS
NOBLE QUALITIES OF HEART
AND MIND.

226898

NOTE.

One year ago I published a series of papers on "Epilepsy" and "Hysteria," which articles appeared in the "New York Medical Journal" and "Gaillard's Medical Journal."

The present publication is an amplification of those studies, which, as they now appear, possess, to all intents and purposes, the qualities of a systematic treatise.

26 West 47th Street,
New York, July 30th, 1888.

TABLE OF CONTENTS.

PART I.

HYSTERIA.

CHAPTER.		PAGE.
I.	Introductory Note—Definition	1
II.	Symptomatology—Psychical Manifestations	4
III.	Sensory Disorders—Hyperæsthesia	25
IV.	Sensory Disorders Continued—Anæsthesia	37
V.	Motor Disorders—Spasms—Paralysis	41
VI.	Vaso-motor Disorders—The Hysterical Cough	49
VII.	The Hysterical Paroxysm	57
VIII.	Hysteria in Children—Hysteria in Men	62
IX.	Causation—Pathology—Diagnosis	68
X.	Prognosis—Treatment	74

PART II.

EPILEPSY.

CHAPTER.		PAGE.
I.	Classification—Symptomatology--Symptoms which Immediately Precede the Attack—Auræ Epilepticæ	83
II.	The Manifestations of the Epileptic Paroxysm—Grand Mal	90
III.	The Manifestations of the Epileptic Paroxysm Continued—Petit Mal—Seizurers Characterized by Loss of Consciousnes and Local Spasms	95
IV.	Masked Epilepsy	99

PART II—EPILEPSY—CONTINUED.

CHAPTER.		PAGE.
V.	"Thalamic" Epilepsy—Jacksonian Epilepsy—Sensory Epilepsy	103
VI.	Causation	109
VII.	Experimental Researches	117
VIII.	Experimental Researches Continued	123
IX.	Patho-anatomical Findings	139
X.	The Mechanism of the Epileptic Seizure	142
XI.	Concerning the Nature of the Irritation—Theories of Nothnagel, Todd and Hughlings Jackson	152
XII.	Prognosis—Treatment	157
XIII.	Treatment Concluded—Epileptic Insomnia	163
	Index	171

PART 1.

HYSTERIA.

CHAPTER I.

INTRODUCTORY NOTE—DEFINITION.

So heterogeneous and multitudinous are the symptoms of the disease known as hysteria that an exact description of the affection is exceedingly difficult, and an adequate definition little short of impossible.

We can be certain, however, that a large proportion of the manifestations of the affection are directly attributable to a functional derangement of the brain and spinal cord, while not a few of the phenomena are probably traceable to a morbid condition of the sympathetic and peripheral nervous system.

It is impossible, moreover, to regard hysterical phenomena as the result of other than purely functional disturbances of the nervous system, since pathological anatomy has failed to afford other than negative data. Nor is it probable that much enlightenment as to the ultimate morphology of the disease is to be anticipated from purely patho-anatomical sources On the contrary, if we are ever to be informed as to the nature of the occult pathology involved, it is undoubtedly to a future pathological chemistry that we

are to look for such knowledge. When, too, the present incompleteness of *physiological* chemistry is borne in mind, there is evidently no immediate prospect of enlightenment from that source, were our metaphysical endeavors ever so great. It cannot, therefore, be said that the probabilities of early enlightenment upon the subtle pathological changes which lie at the root of hysterical phenomena are considerable.

Whatever the ultimate nature of these changes may be, we may nevertheless, rest assured that they must be wide-spread in character, since only on the basis of such an assumption is it possible to account for the heterogeneous array of symptoms.

For the present, then, hysteria may be regarded as a general neurosis of the nervous system, characterized by psychical, motor, sensory, secretory, vasomotor and reflex derangements. The justification for including symptoms of so heterogeneous a nature under one common designation has been questioned. But, on the other hand, it has been urged that all these symptoms, though not always, are frequently associated in one and the same individual, so that the assumption that they are all attributable to one general cause seems in a measure justifiable.

Be the merits in the case what they may, we shall, at all events, adhere to current usage, if for no other reason than to avoid uncertain and profitless discussion.

Dismissing this portion of the subject, we will

content ourselves with but one more observation, before proceeding to give a comprehensive description of the affection. Owing to the circumstance that hysteria is found to prevail to a greater extent among women than men, and also to the fact that changes in the condition of the female genital organs exert an undoubted influence upon the development of hysterical phenomena, it has been assumed that hysteria is an affection exclusively confined to females. Moreover, the same line of reasoning has led to the assumption that hysteria is invariably the result of a diseased condition of the genital organs.

The integrity of the first portion of this proposition simply depends upon the breadth of significance which we give to the term hysteria. Most certainly a lachrymose condition, accompanied by laughter and choking, is found in men, as I have already had occasion to show in former communications.* But whether the more serious manifestations of the affection are found in the male sex has been questioned.

On the other hand, the second portion of the proposition—that which assumes that hysteria is invariably the result of uterine or ovarian disease—may be dismissed without further comment as manifestly opposed to a vast sum of clinical evidence.

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* Brain Exhaustion. By J. Leonard Corning, M. D., New York, D. Appleton & Co., 1884. p. 116, *et seq.*

CHAPTER II.

SYMPTOMATOLOGY—PSYCHICAL MANIFESTATIONS.

Symptoms.—The disease usually develops gradually, though in certain cases there is apparently a sudden exacerbation of symptoms, doubtless attributable to the fact that the prodromata had been overlooked. In another category of cases, however, the onset of the disease is evidently sudden, the attack coming on in the course of a few days in persons previously healthy. Thus it sometimes develops after sudden fright and grief, or after acute diseases or severe hemorrhage. Cases of this kind must, however, be regarded as constituting rather the exception than the rule; but they are not the less worthy of attention, since a knowledge of the possibility of their occurrence will serve to prevent many an error in diagnosis. This form of onset is frequntly characterized by the occurrence of one of those paroxysmal seizures so peculiar to hysteria. We shall take occasion to refer at length to those convulsive phenomena, in connection with the discussion of the motor manifestations of the disease. For the present we will content ourselves with observing that, although we shall adhere as much as possible to a systematic discussion in the following description, no corresponding chronological order is really found in the disease itself. Indeed,

there is no affection in the whole range of medicine the symptoms of which are subject to greater variations than those of hysteria. As a consequence, the order of discussion adopted in any description is purely a matter of convenience, and is utterly devoid of objective significance, as far as the disease itself is concerned. Since mental disturbances are usually among the earliest and most characteristic manifestations of the disease, it will be well to take up their consideration first, though this is not the method usually adopted in the books.

Psychical manifestations.—A certain mental exaltation, accompanied by extreme irritability, is the most obvious psychical symptom. The inhibitory power of the intellect over the emotions seems suppressed; the subject yields herself with apparent indifference to sentiments of the most opposite character; joy succeeds sorrow, as evinced by alternate attacks of laughter and crying; there is an apparent complete paralysis of volition.

As a direct result of these chaotic and ebullient emotions, the patient becomes exhausted and peevish. She is excited and moved to immoderate annoyance by the veriest trifles; or perchance an exactly opposite condition of things is engendered, and she signifies approval in terms so extravagant as to cause amusement and astonishment to those about her. By degrees, however, the susceptibility to pleasant emotions diminishes, as the exhaustion consequent upon the in-

ordinate psychical output becomes greater and greater. And, as a final result, disagreeable emotions become preponderant. At the same time a chronic tendency to introspection becomes established, a condition which culminates in one of the most disagreeable and at the same time characteristic manifestations of hysteria, a *morbid craving for sympathy*. The subject becomes completely absorbed in what she considers her deplorable condition, and thinks and talks of her ailments without ceasing. As, by degrees, her friends become accustomed to these lamentations, and by ascribing them to imaginary causes, fail to render the customary sympathy, she becomes desperate. Her inordinate egotism is offended; to her distorted vision there is but one commanding personage in the universe—herself—in comparison with whom the rest of mankind are as nothing. But, like many a royal egotist, while heartily despising the ways of the plebian portion of humanity, she is eminently anxious to obtain its plaudits and servility. How to obtain an endless sympathy from obdurate mankind, without the slightest return, is the great question to the hysterical, the cord from which all their present and future hopes hang suspended. In order to obtain the coveted boon, the whole moral nature is trampled under foot; prevarication, false witness, theft, and even murders, are the means to which resort is had, when the milder expedients of constant lamentations and weeping have failed to keep the sympathy of

family and friends up to the desired standard. These crimes of the hysterical, committed apparently, in many cases, without the slightest tangible reason, form one of the most extraordinary chapters in the whole range of criminal jurisprudence.

The following history, furnished by Cullingworth,* is an illustration of a case of this kind:

"In December, 1876, a girl of eighteen was found one evening standing, with her clothing wet and muddy, and in an apparently stupefied condition, in the closed doorway of a restaurant in the centre of Manchester, a few yards from where she was lodging. She was taken home and put to bed, and a medical man was sent for. He found her to all appearance unconscious of what was going on around her, and uttering some disjointed and incoherent complaints of having been drugged and threatened. He thought she was recovering from the effects of some narcotic, and did not at first pay much attention to her story. The following day, however, she appeared worse, and in the evening her condition was considered so critical that the police were communicated with, with a view to her statement being taken down. She was visited by two experienced detectives, who, seeing how matters stood, and having the doctor's assurance that she was in a dying state, sent at once for a magistrate, before whom she made a solemn declaration to the

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* Cited by Ross, op. cit., p. 855.

following effect: she believed herself to be dying. On the previous evening a solicitor, at whose office she had called on business, told her that she must go into a convent, and gave her some sort of dark, sweet drink, which rendered her senseless. On going down stairs from the office, she met a Jesuit Father, whom she had met once before. This gentleman pulled her along the street to a little house in a court, where there was an upper room with a bed in it, and a cross on the wall. Having got her into this room, he said improper things to her, and gave her a little cake, which affected her directly. The woman of the house came into the room and found her on the floor, after which she somehow got outside; the priest following her, again dragging her along in the dirt to the street corner, when he ran away."

"The solicitor and the priest, both of them well known and highly respected, were thereupon placed under arrest in the middle of the night, on the charge of having administered certain poisonous drugs with intent to murder. The story was proved to be purely imaginary, and the magistrate dismissed the case."

Self-mutilation is sometimes practiced by hysterical patients in order to obtain sympathy. The following is a case in point, which was reported some years since by Dr. Channing:*

"Mrs. Miller was first seen by us in 1875, a month

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* American Journal of Insanity, January, 1878, p. 368.

after admittance to the asylum. She was an intelligent German Jewess, rather below the medium size, thirty years of age, hair and complexion light. She was then thin in flesh, pulse weak, hands red and cold, lips bluish, tongue pale and tremulous when extended; but few of her teeth remained, and her face had a pinched look; her smile was very pleasant, but her expression at other times was suspicious and irritable."

"She was in bed suffering from what seemed to be a severe attack of hæmatemesis; various remedies were applied, but the hemorrhage continued several days unabated. Her bodily condition continuing, however, perfectly good, notwithstanding the blood lost, simulation was suspected; treatment was suspended, and the bleeding ceased. The coffee-ground appearance of ejected matter she had imitated by vomiting food into her chamber-vessel and covering it with blood (pricked and sucked from her gums) and urine. This attack was followed by others of hysterical dysmenorrhœa and dysentery. Toward the end of the month she became much depressed. * * * On the 25th of the month, in a paroxysm of despair, she broke twenty-three panes of glass; with a small piece of glass she cut her left wrist, and, inserted it into the wound, endeavored to reach the arteries. * * * She was much agitated, trembling from head to foot, and crying, but however said nothing. The next day she was very repentant for what she had done, and said that she

would never try to do it again; but in about three weeks she again became 'discouraged,' to use her own words, or depressed, irritable, and suspicious, and, being enraged because she had been refused opium, cut her arms to avenge her wrongs. The wounds were immediately below the elbow, on the inner surface of the forearm, where the flexors are thickest. One cut was six inches in length, the other four. * * * She was crying, and endeavored to conceal the cuts when seen, and would say nothing as to the situation or number of pieces of glass she was said to have thrust into the wounds." On examination under ether, several pieces of glass were found in the wound and removed. Subsequently, she wounded herself in like manner several times, with the result of finally setting up an erysipelatous inflammation, which, in its turn, was followed by œdema glottidis; suffocation appearing imminent, tracheotomy was performed; on the eleventh day the tube was removed, and the wound healed in three weeks after the operation.

For some time subsequently she appeared to improve; but after a time the mutilations were begun afresh and continued more or less frequently until June, 1877, when she cut herself for the last time, and soon afterwards "broke her chamber-vessel to pieces on the wall over her head."

"The following is a list of articles which have been removed from her arms and saved: ninety-four pieces of glass, thirty-four splinters, two tacks, four

shoe nails, one pin, one needle. Several pieces of glass, and the pins and needles first removed, were unfortunately mislaid and lost. Including these, the whole number of objects removed amounted to one hundred and fifty. * * * The longest splinter was nearly six inches long." * * *

"Strange as it seems, she apparently experienced acute erotic pleasure from the probings which she was subjected to." * * * "She has been very hysterical, having frequent attacks of choking, globus hystericus, and imagined at one time that she had a spool in her throat, and could only swallow through the hole in the middle."

This case is certainly unique, as regards the character and extent of self-mutilation practised.

Dr. Channing also cites the case reported by Dr. Robie,* of the Dundee Asylum, in which an hysterical woman swallowed a circular tea-cady, one and one-fourth inches in diameter, with suicidal intent.

Dr. J. B. Andrews, of the Utica Asylum, has reported a most interesting case, in which he removed three hundred needles from the body of a female patient. The needles had all been inserted before she became a patient in the asylum. The patient was hysterical, and bore a strong resemblance, in some respects, to the case of Mrs. Miller.†

Soon after the introduction of anæsthetics, an

*Journal of Mental Science for July, 1875.

†Journal of Insanity for July, 1872; quoted by Channing.

unusual form of accusation made its appearance in court. These accusations were based upon the allegations of certain women, to the effect that they had been outraged while under the influence of an anæsthetic, in the office of a physician or dentist. Medico-legal literature abounds in cases of this character.* When these peculiar charges were first made in court there can be little doubt that gross injustice was frequently done, as both judge and jury were but too liable to lend undue credence to the women declaring themselves aggrieved. In a short time, however, it became evident to court and jurors alike that the women who made these accusations had either labored under some unusual mental aberration, incident to the inhalation of the anæsthetic, or were the victims of some form of neurosis. It was natural, under these circumstances, that the thoughts of medical witnesses should revert to hysteria; and accordingly, at the present day, the connection of this insiduous affection with many cases of this kind has been clearly made out.

The following are evidently cases in point: "In 1854 a clergyman's sister came to my office for the purpose of taking ether and having a tooth extracted,

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*Vide "Medical Jurisprudence" of Wharton and Stillé.

"Artificial Anæsthesia and Anæsthetics," by Henry M. Lyman, A.M., M.D., etc. New York: William Wood & Co., 1881. Also

"A Manual of Medical Jurisprudence, by Allan McLane Hamilton, M.D., Birmingham & Co., New York, 1883.

and brought her brother's wife with her. I began to administer the ether to the patient, and whilst renewing it she got away from me, and seemed alarmed and offended. I did not attempt to compel her to breathe any more ether, but urged her to take it, and so also did her brother's wife; but she would take no more; she had the impression, so her brother told me, that I attempted to violate her, and that his wife assisted me. It was a long time afterward before she would fully give up that she was mistaken in the matter."*

The following case is quoted by Lyman:† "A case of the utmost importance to the whole profession, not in Great Britain only, but everywhere, was tried before Mr. Justice Hawkins, at the assizes at Northampton, on the 9th of November. It was a charge against a surgeon's assistant of criminal assault—of rape upon a patient when under the influence of chloroform. If there is a dastardly crime, it is to take advantage of a woman's helpless unconsciousness to violate her person. And so the magistrate thought, who sent the accused to jail on the 14th of September, declining to hear anything in his favor, and resolutely refusing to accept bail. The charge was that a married woman, named Child, went to the surgery of her family medical attendant to have her teeth operated

*Dr. N. L. Folsom, in the Med. and Surg. Reporter for January 12, 1877. Quoted by Dr. Lyman, op. cit., p. 95;

†Contained in the Philadelphia Medical Times for December 22, 1877.

upon. She had been there a day or two before, but the attempt to put her under chloroform had failed. A second attempt was rather more successful. She evidently had some peculiar idiosyncrasies in relation to chloroform, for he gave it for an hour, and yet she was never sufficiently under its influence to admit of the operation being performed. She was accompanied by a friend—a Miss Fellows. At the end of an hour Miss Fellows went out of the room and saw Mr. Child. In a quarter of an hour Miss Fellows returned. The prosecutrix maintained that on Miss Fellows' return she was quite conscious, but unable to speak. Finding it impossible to perform the operation, the accused accompanied the prosecutrix and her friend home. So far Mrs. Child had been unable to speak, but shortly after the accused left the house she complained to her husband that he had taken advantage of the absence of Miss Fellows to assault her criminally. Next day, when the accused called, he was told about what she had said, and he replied that she was laboring under a delusion. Under cross-examination, Mrs. Child said that she told the accused that if he would admit the offense and quit the town (Birmingham) she would forgive him. This the accused declined to do, denying that he had committed any offense. He was then given into custody. The prosecutrix stated that the offense was perpetrated immediately after Miss Fellows left the room, that the prisoner went upon his knees and then assaulted her. Miss Fellows

stated that on her return she found Mrs. Child in precisely the same position in the chair which she occupied when she went out of the room. Such were the facts of the case. * * * In the meantime the unfortunate surgeon's assistant was sent to prison.

"When the case came to be tried, a large number of medical men of repute came forward voluntarily to aid the accused's defence, and did this quite gratuitously."*

A number of cases were related by medical witnesses, in which females, undergoing operations at the hands of dentists and surgeons, had alleged that they had been criminally assaulted, persisting in this belief in some cases for years afterwards.

Finally, the judge demanded of the jury whether it was necessary to sum up, and they replied it was unnecessary; they were already agreed upon a verdict of acquittal. "Mr. Justice Hawkins pointed out that such a verdict would not be the slightest imputation upon the absolute sincerity of the prosecutrix, who, no doubt, firmly believed every word of what she had said. He then congratulated the accused upon having had an opportunity of fully vindicating himself upon the charge preferred, and said that the verdict of acquittal did not mean that there was insufficient

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*Among these witnesses, was the celebrated Dr. B. W. Richardson, to whose testimony the subsequent acquittal of the accused was in great measure attributable.

evidence, but that the accused was entirely cleared of any imputation in respect to the charge preferred against him. * * * The accused was then discharged from custody, having been in prison two months for no offence."

It is a common belief among certain persons that the mental phenomena recorded above are due to some extraordinary effect of the anæsthetic. But it is a noteworthy circumstance that such cases are usually observed among neurotic, hysterical females, or among those in whom there is a strong erotic tendency. A certain constitutional predisposition seems, therefore, a pre-requisite in all such cases. There can be little doubt that such an hysterical predisposition was present in the foregoing case, though the clinical history is somewhat incomplete on this point.

When such instances occur, diligent inquiry should always be made regarding the family history. The discovery of the existence of consanguineous insanity, or the affirmation of witnesses that the prosecutrix is of a "nervous," hysterical disposition, should be accepted, in the absence of other more positive testimony, as proof positive of the innocence of the accused. In our estimation the verdict rendered in the case above cited was most just and in entire harmony with the most enlightened scientific opinion.

Fictitious attempts at suicide are a favorite means of attaining sympathy among hysterical women. An instance of this kind came under my immediate notice

but a few weeks since. The history in brief was as follows:

Mrs. C., a young woman of apparently robust constitution, had been married but two years, when she became feverish and restless, complaining that, ever since the birth of her child, she "had not been the same woman." She also developed the idea that her husband was faithless in his marital relations, although the latter gave constant and convincing proof of his affection. Her constant complaining, and alternate weeping and laughter, caused such pain and annoyance to those about her that the family physician was consulted on several occasions with regard to her condition. On hearing that her medical adviser had expressed the opinion that she was a sufferer from hysteria, and that her sufferings were purely the product of the imagination, she became very angry, and declared that she was the victim of a "plot." Soon afterwards, while the family were sitting at table, she suddenly appeared in the room, and declared that she had taken poison, exhibiting, in corroboration of her assertion, a vessel containing a quantity of finely-powdered glass. During the scene of consternation which succeeded this tragic announcement, she preserved an imperturbable exterior, and seemed rather gratified than otherwise at the sorrow depicted upon the countenances of those about her. When, however, the hastily summoned medical attendant proposed the administration of an emetic, and at the same time

made preparations to introduce the tube of a stomach pump, she protested vigorously, by word and action, biting and scratching those who attempted to restrain her. Finding, however, that her strength was failing, and that she was about to be overpowered, she confessed that she had not yet swallowed the broken glass, but was about to do so in the presence of the family, in order that her loss might be more "appreciated."

Such cases are common enough in practice, and when the previous history of the patient is accessible, they need cause but slight embarrassment.

It would be possible to multiply histories of like character, growing out of a morbid desire for notoriety and sympathy, almost *ad infinitum*. Medical and legal literature abound in cases of this kind. Without pursuing the subject further, however, we will content ourselves with stating that such instances are by no means confined to the female sex, but are found to prevail among men, though to a less extent than among women.

Besides the more pronounced mental phenomena exhibited by hysterical persons, which the foregoing description and cases have served to display, individuals of this class are subject to various other forms of psychical disturbance.

One of the most distressing mental symptoms found in the hysterical consists in a persistent morbid impulse to commit some act of violence. The objects of such morbid impulses are usually found among the

immediate friends or family connections of the patient. Thus I was consulted recently by a German as to the mental condition of his wife, who had caused great uneasiness by announcing that she was afraid to remain alone with her children, as she had an uncontrollable impulse to "throw them out of the window." She also begged her husband to remove a revolver, which he was in the habit of placing under his pillow at night, as she declared that she felt an almost resistless impulse to take the weapon and "shoot him in his sleep." Her general mental condition was described as "nervous," by which was meant that she was fretful, feverish, and lachrymose. In appearance she is stout and healthy, and the only derangement in bodily function is an occasional attack of dysmenorrhœa.

This morbid explosiveness, this tendency to commit acts of violence, frequently finds expression in the destruction of inanimate objects. This form of mental disturbance is prevalent among young girls of hysterical tendencies. Instead of the irritable and explosive tendencies finding vent in violent conduct toward individuals, the destructive impulses are directed towards the inanimate environment. The bed clothes are torn into shreds ; tapestries are pulled down ; the clothing is thrown about, and the furniture broken in pieces. Sometimes the house is set on fire, and the most incredible intrigues concocted against friends and acquaintances. In many instances, as we have seen, the subject seeks to gain sympathy and notoriety

by her extraordinary conduct; and to attain this end she does not hesitate to lie, defame at, or even commit murder. On the other hand, in not a few cases, it is utterly impossible to ascertain the slightest motive for the commission of the various heinous crimes of which the hysterical are guilty. Sometimes the duplicity of hysterical women is so profound as to baffle the efforts of the most expert medical witnesses. As a consequence, the ends of justice are frequently perverted, and on more than one occasion perfectly innocent persons have suffered at the hands of the law for crimes which have subsequently been shown to be the acts of hysterical females. From what has been said, it is evident that the medico-legal relations of hysteria are of the utmost interest and importance. Were this the proper occasion an entire chapter could well be devoted to this branch of the subject; but as such a digression would evidently transcend the scope of the present work we must content ourselves with referring to the excellent book of Legrand du Saulle,* and the more recent little work of Dr. Allan McLane Hamilton, which certainly constitutes a valuable contribution to legal medicine.

Hysteria is frequently complicated with mental disturbances of such profundity as to constitute a veritable "insanity." By this we mean that the psychical disturbances attain the gravity of mania or melan-

*Les Hystériques état physique et état mental, etc., par le Dr. Legrand du Saulle, Paris, 1883.

cholia, with sexual or uterine symptoms, feigned bodily affections and other deceptions, practiced with a view to obtain sympathy; and a morbid irascibility and erotomany. The erotic tendencies may be concealed at first; but careful interrogation and observation almost invariably end in their discovery.

The threats and abortive attempts at suicide resorted to by the patient have usually little significance, and rarely result in grave consequences. Hysterical convulsions and retention of urine, of which we shall take occasion to speak later, are sometimes present.

Sometimes the diagnosis of this form of mental derangement presents peculiar difficulties, and there is great liability of confounding it with masturbational and "adolescent" insanity. The most we can do when doubts of this character arise is to postpone a definite verdict until all the facts in the case are thoroughly known. We should, moreover, guard against pronouncing a case one of hysterical insanity until we have become thoroughly convinced that the hysterical symptoms constitute its most prominent feature.

Of hysterical insanity Clauston observes: "The fasting girls, the girls with stigmata, those who see visions of the Saviour, and the saints, and receive special messages in that way, the girls who give birth to mice and frogs, and those who live on lime and hair, are all cases of this disease."*

*Op. cit., p. 331

The following case, quoted from Clauston, is a fair illustration of hysterical insanity : " J. U., age 21, of nervous and excitable temperament; habits correct. An epileptic. Had on one occasion at home a mild attack of what must have been sub-acute maniacal excitement. The cause of the present attack, which had lasted for four days, was a fright which first produced ordinary hysterical symptoms, and then maniacal symptoms engrafted on them. She shouted and screamed, and spoke of hearing God speaking to her, and would rush to the window to jump out. She imagined she was a most important person, attitudinized, and did everything to attract attention to herself. Attention and sympathy were craved by her, and if she could not get them in one way she tried another. She refused her food, saying it was poisoned, but took it rather than be fed with the stomach pump. She had menorrhagia, and was most minute and circumstantial in the details as to her health. She was tried with hyoscyamine, valerian, and monobromide of camphor, with apparent benefit ; but I consider the greatest improvement was produced in her case by discipline, work, open air exercise, tonics, and good plain food in abundance. She improved at first, and once or twice relapsed, but in two months she recovered and was discharged. I do not like to keep hysterical cases too long in the asylum after convalescence, as a general rule, for they sometimes get too fond of the place, preferring the dances, amuse-

ments, and general liveliness of asylum life, even with its restrictions, to the humdrum and hard work of poor houses."*

The following is an exceedingly characteristic letter of a maniacal hysterical girl, and seems to illustrate in a striking manner the morbid psychology of the subject: †

"My Dear Mamma—It is time that I leave to return home. I have been tremendously changed for the better. I think papa will be able to get me a commission under Garibaldi before long. There are three to whom I am especially indebted—one Mr. C., the modeller, the other, the doctor, a eunuch who modelled me at the fire and attended me and bathed me. He is, I am sure, a gentleman, a splendid doctor. Could not papa get him into a regiment abroad? And there is the nurse. Could not papa get him a situation away from Morningside Asylum, where I am at present? I should like papa to come for me as soon as possible. Do you remember the verse, "There are," etc. (12th verse, ix. chapter of Matthew) about eunuchs? Then I beg to inform you that, according to Scripture and my conscience, Jessy, your cook, is

*"Clinical Lectures on Mental Diseases," by T. S. Clauston, M. D., etc., Philadelphia, 1884.

†Taken from the "Morosonian Lectures," by Drs. Skaal and Clauston, for 1873, *Journal of Mental Science*," vol. xix, p. 500; vide also "Clinical Lectures on Mental Diseases," by T. S. Clauston, Philadelphia, 1884–1885, p. 341.

a man ; and Janet, the mad devil, is a man ; and D. and H., boys, who can have children. Aunt I. is a man, and yourself also, both made of men, and I am a boy, made of Dr. C. and Dr. Z. Mrs. T. is a man made of men. They are very ignorant on this subject here ; but as for me, it is certain that at least the spirits have shown me, which Christ sent me when I was under drugs ; they showed me this. I have at times since I come here passed the shadows of death, and therefore am authorized to speak in opposition to all men and women, gentlemen and ladies, who oppose me. I am, I can swear, as you want to know what sex I belong to, a mixture of a nymph and a half man, half woman and a boy, and a dwarf, and a fairy. I know more than my fellow mortals, have expired eleven times before the time.—I am, etc."

CHAPTER III.

SENSORY DISORDERS—HYPERÆSTHESIA.

Hyperæsthesia is an almost invariable accompaniment of hysteria, and may involve a portion or all of the special senses. Sometimes there is an abnormal increase in the acuteness of the perceptive faculties; so that it is a subject of common remark, even among the laity, that hysterical persons see, hear, smell, and taste with greater keenness than those in health. Again there may be a certain degree of sensory perversion, manifested by a dislike for certain stimuli which by the healthy are looked upon with indifference or even regarded as pleasurable. Or there may exist a positive liking for sensations which, to the majority of mankind, are regarded with feelings of repugnance.

Coupled with these anomalies of sensation, there exists, in the majority of cases, a corresponding perversion of the higher mental faculties—a veritable "*psychical hyperæsthesia*," as Jolly calls it. We have already discussed the various mental disorders of the affection, which may properly be comprised under this heading, in the previous paragraph, and therefore abstain from further particularization on the present occasion. Coeval with these sensory disturbances, certain anomalies of perception appear, which, in the absence of all primary excitement of the peripheral

apparatus, cannot be regarded otherwise than as purely subjective. It is thus that the true hallucinations of hysteria originate—phenomena which unquestionably lie at the root of the illusions and delusions of the more serious mental complications of the affection.

Perversion and exaltation of the senses of smell and taste are especially frequent. The subject declares that she detects odors of an agreeable or repugnant nature, which remain imperceptible to those about her; and careful investigation shows that she really is able to discover the presence of astonishingly minute quantities of semi-inert substances. With this unusual power of perception there is often marked sensory perversion, manifested in a strong dislike for certain substances which by healthy persons are considered to possess an agreeable taste or odor. Or the process is reversed, the subject expressing herself as delighted with the odor and taste of the most disgusting substances. Thus a lady afflicted with hysteria confessed to me that the odor of excrement was agreeable to her; while another patient, a young girl, tells me that the odor of eau de cologne excites in her feelings of the liveliest repugnance.

Cases exhibiting a decided increase in the acuteness of the sense of smell are found in the literature of the subject, and are by no means as rare, according to my experience, as some writers appear to imagine. For example, the lady above referred to declared that

she was able to detect the presence of her four-year-old child by the aid of the sense of smell, when the latter entered unexpectedly a neighboring apartment; and a hysterical boy whom I have recently seen is able, according to his father, to appreciate the presence of a dog or cat, even when the latter are at some distance and totally invisible. Doubtless similar instances will occur to most physicians of extended experience.

When hallucinations of smell and taste exist in complicated cases, they are said to particularly facilitate the establishment of more or less permanent delusions.*

I cannot say that my own experience agrees entirely with the foregoing, since I have found that hallucinations of other senses, particularly those of hearing, are quite as prolific of erroneous ideas as those of smell and taste.

Hyperæsthetic conditions of the organ of *sight* are frequently met with. Sometimes the subject complains that bright light is disagreeable to her, and resort is had to colored spectacles, which may afford apparent relief. In other cases the photophobia is so great that the afflicted women seclude themselves in darkened rooms for days together, refusing food except when brought to them. Sometimes the hypersensitiveness is only apparent in connection with

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* Vide Jolly on Hysteria, op. cit., p. 497.

certain colors, especially red. Subjective sensations of light, assuming the form of spots, flashes, and sparks are also observed. In some cases, the subjective appearances attain to the dignity of veritable hallucinations, which may be agreeable or repulsive in character. The physiological substratum of the condition known as *ecstacy* is unquestionably to be sought after among these visual hallucinations.

Sometimes the subject recognizes the subjective nature of many of these impressions; but in other cases it is impossible to convince her of the unreality of the phenomena. Under the latter circumstances delusive opinions may arise.

In some cases there is a manifest increase in the acuteness of vision, which is not to be accounted for merely on the score of a prolonged sojourn in a darkened room. The extraordinary narratives of the visual powers of hysterical persons, in which the latter are said to read with their back turned or with closed eyes, are evidently unconscious perversions of the truth or gross deceptions.

The sense of *hearing* is often exaggerated in hysterical persons to such a degree that they readily appreciate sounds which are imperceptible to healthy individuals. So sensitive do they become to sound that such an ordinary occurrence as the squeaking of a door, the rumbling of a cart, or the cry of a child is sufficient to cause the most intense annoyance. Subjective sensations, such as ringing,

blowing, roaring, humming, and singing are frequently encountered; and true auditory hallucinations are also met with. As we have already had occasion to observe, the latter frequently result in establishment of more or less pronounced mental aberration.

In almost all cases of hysteria there is present a *morbid sensibility to pain.* This exalted susceptibility to painful impressions may be confined to the skin or may involve the more deeply seated tissues. It is subject, moreover, to irregular topographical distributions. This is particularly true of cutaneous hyperæsthesia, which, though sometimes general—being distributed over the entire surface of the body—is often confined to certain isolated regions of the integument. Sometimes the skin of one half of the body, or one or more extremities, or of certain portions of the trunk, is alone affected. In yet other cases hyperæsthesia and anæsthesia are encountered side by side, or at all events isolated anæsthetic islands are found in the midst of more or less extended hyperæsthetic areas. These curious phenomena certainly constitute a most enigmatical chapter in pathology; but it would be a practical waste of time to examine the various more or less ingenious hypotheses which have been advanced with a view to their explanation.

When the cutaneous hyperæsthesia is general, the patient suffers great torture on attempting to execute such simple movements as turning about in a chair or dressing. In the more exquisite cases, the mere im-

pact of the bed-clothes is sufficient to cause acute pain, and in some instances convulsions.

Besides the hyperæsthetic phenomena above referred to, almost all hysterical individuals complain of pain, which may be diffuse in character or confined to the most diverse localities. Sometimes the pain is felt over the entire extent of the abdomen, and may be associated with tympanitis. At others neuralgic pains are present in the mammary glands, the latter being often of such intensity as to render the contact of the clothing or bed-linen absolutely unendurable. The hyperæsthesia is particularly marked during the menstrual period. Cardialgia is another frequent symptom of hysteria, and one which is often associated with more or less persistent vomiting—a combination of symptoms which may give rise to the erroneous preconception that we have to do with perforating ulcer of the stomach. This impression is furthermore enhanced by the fact that hysterical females are often great gourmands, devouring everything set before them with an appetite apparently insatiable. It is evident that such persistent gluttony can only result in an aggravation and perpetuation of these digestive disturbances; indeed, I am not sure but that this overloading of the stomach constitutes the starting point of many of the gastric disorders to which the hysterical are liable.

Hysterical persons are often afflicted with an hyperæsthetic condition of the ovaries, associated, in

many instances, with anæsthesia of the same side. At the same time they complain of irritation about the external genital organs, associated with a morbid increase of sexual excitement. This latter condition, which is particularly pronounced at the time of menstruation, may give rise to reflex spasm of the sphincter muscle ("vaginismus")* a state of things peculiarly unfavorable to coitus. Owing to the irritated condition of the urethra and bladder, which is an almost constant concomitant, the desire to urinate is frequent, and the act is rarely accomplished without considerable pain.

Dorsal pain is a more or less frequent accompaniment of hysteria. Sometimes it is situated in isolated spots between or above the scapulæ, at others it is distributed in a more or less continuous band along the course of the vertebral column (*spinal irritation*). In the more exquisite cases the slightest pressure above the vertebræ is sufficient to cause severe pain, while the passage of the wire-brush, with a moderate current, along the spine is sufficient to reveal the presence of hyperæsthetic spots, in the less severe cases. Sensitiveness of the uterus, though not a constant symptom as formerly supposed, is frequently met with; and while doubtless dependent, in some instances, upon

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*Vide the writings of Drs. J. Marion Sims and T. Gaillard Thomas; also, Axenfeld et Heuchard. "Traité des névroses," Paris, 1883.

uterine disease, must in many other cases be regarded as of purely neurotic origin.

Thus cases of uterine pain are often met with in those who have been treated for protracted periods for some form of supposed disease affecting the uterus without the slightest beneficial result. But when placed upon the back and treated according to the system of spinal rest so ably advocated by Mitchell, they often display astonishing improvement in a short space of time.

Of great theoretic and practical interest are the pains occurring about the joints of hysterical persons pains which are frequently mistaken for symptoms of true articular disease.

To Sir Benjamin Brodie* has been ascribed the credit of having directed the attention of the profession to the frequency of these enigmatical symptoms.

When pressure is exercised upon the joints of those affected by this form of articular neurosis, severe pain is produced. It is evident, however, that this pain is located in the soft tissues about the joint rather than in the latter, since the forcible apposition

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*Brodie, Sir Benjamin, "Lectures Illustrative of Certain Local Nervous Affections," London, 1837. Also Esmarch, Ueber "Gelenkneurosen," 1872. Stromeyer, "Erfahrungen ueber "Localneurosen," Hanover, 1873. Werner, "Ueber Nervose Coxalgie," Deutsche Zeitschrift fuer Chirurgie, Band I. Berger, "Zur Lehre von den Gelenkneuralgien," Berliner Klinische Wochenschrift, 1883.

of the articular surfaces fails to produce the disagreeable symptoms and shock peculiar to true joint-disease. Atrophy of certain muscles has been noted by some observers,* after the affection had continued for a series of years. It is probable, however, that the attenuation of the muscles is never so great as in organic disease of the joints.

The articulations most frequently involved are the knee and hip joints, but even the smaller joints of the wrists, ankles and, fingers are sometimes affected.

It is evident that an accurate diagnosis in cases of this kind is of the utmost importance, since, if the affection be mistaken for true joint trouble, the patient is liable to all the inconvenience arising from prolonged antiphlogistic and orthopædic treatment. Before delivering a final opinion, therefore, the patient should be subjected to a rigorous physical examination. At the same time the most searching inquiry should be instituted regarding her general physical and mental health, with a view to discovering any indications of hysteria or other neurotic trouble. Not until we have exhausted the last resources of investigation are we justified in forming a definite conclusion as to the nature of the affection.

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*Vide "Nervous Mimicry of Organic Disease, by Dr. J. Paget. The Lancet, Vol. II. 1873.

The following cases reported by Skey* are fair illustrations of these joint affections:

"Annie W——, aged twenty-two, was admitted into Treasurer's Ward in the spring of last year. She had been confined to her bed for twelve months, and was sent up from her parish, near Bedford. During twelve months she had been totally deprived of motor power in the left leg, and during ten months in the left arm. The two extremities lay on the bed perfectly motionless and paralytic. Indeed, her case was reported to me as one of hopeless and incurable palsy. There was something strange in the girl's aspect, and in the total absence of motor power extending to the toes. A truly paralytic limb is rarely so dead as these limbs were; we can often obtain some sligh manifestation of volition, even though in the slightest motion of one or more of the toes. In this case there was absolutely none detectable to the eye. I suspected it to be a case of hysteria, and ordered her valerian and ammonia in full doses after the first three days; meat diet and porter. In four days movement on volition was perceptible in all the toes and in the hand. In a fortnight she could move her arm and leg slowly in all directions. In one month she walked on crutches about the ward, and in six weeks she left the hospital convalescent."

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* "On Hysterical Affections of the Joints," by Frederic C. Skey, F. R. S. *The Lancet*, March 12, 1859.

The history of the above case is not as complete as might be desired; but the following instance, quoted from the same author, is more to the point:

"Eliza J——, aged twenty-two, was admitted into Treasurer's Ward in April last with an affection of the knee, which incapacitated her for movement of any kind on the affected limb. The joint was scarcely perceptibly swollen, yet she could not bear the most superficial examination by the hand without an expression of pain quite disproportionate to the apparent amount of disease. The temperature of the joint was slightly, but not much, increased. The only explanation obtainable from the girl's statement referred the injury to a fall six weeks prior to her admission, and three weeks before the first appearance and even the suspicion of disease. During the interval of the first three weeks, she "thought the joint felt occasionally more stiff than usual." This girl had a somewhat florid complexion; she had a weak pulse, and, as almost a matter of course, had cold feet and severe headaches. Both sides of the joints bore marks of previous treatment in the form of pretty active scarifications. It appeared that blood had been taken from the joint by cupping on two occasions, to the extent, as nearly as I could learn, of about twelve ounces; and a blister of some magnitude had been applied on its front surface. From these remedies I could not ascertain that any benefit had been derived to the affected knee, and she thought, on the whole, her attacks of headache had

been more frequent and severe. Her bowels were habitually constipated. I ordered her the local application, for three or four consecutive nights, of a liniment composed of two drachms of the fluid extract of opium to an ounce of compound soap liniment, and the joint to be rolled with flannel; twice a day a draught of ammonia and valerian; full diet with a pint of porter daily. The local application was continued with intervals, for eight or nine days, with much relief and without return of pain. At the expiration of a fortnight the medicine was changed to eight-grain doses of ferro-citrate of quinine, and she left the hospital in five days convalescent."*

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* Other contributions to the literature of the subject are: "Nervous Mimicry of Organic Diseases," by Sir. James Paget, *The Lancet*, Nov. 1, 1873. "Paralysie hysterique, attitude vicieuse, pied bot consécutif," by N. Damaschino, *Gazette des Hopitaux*, 1879, p. 50. "Diseases of the Nervous System," Lecture on, by Francis E. Anstie, M. D., *The Lancet*, 1873, Nol. I., pp. 437.

CHAPTER IV.

SENSORY DISORDERS CONTINUED. — ANÆSTHESIA.

Anæsthesia.—Sensibility is frequently diminished or even entirely lost in hysteria. Sometimes the anæsthesia is circumscribed in character, as we have already had occasion to observe, whereas in a certain per cent. of cases it may involve the greater portion of the integument, and even extend to the muscles and other deep-seated tissues. Nor do the nerves of special sense escape; but, on the contrary, as we shall presently see, their implication often gives rise to pronounced functional impairment. Cutaneous anæsthesia usually appears after an hysterical attack, and is liable to aggravation from subsequent seizures. The anæsthesia thus induced exhibits certain amblitory characteristics of a most interesting nature from a clinical standpoint. Thus, after a fresh attack, the anæsthesia may apparently disappear; but, on careful examination, other parts are found to be affected. Or, the previously anæsthetic portions of the integument may become hyperæsthetic.

Sometimes tactile and thermic sensibility as well as sensibility to pain are impaired or lost; but as a rule the capacity to appreciate pain is alone affected. The distribution of the anæsthesia is subject to great

variation. In a considerable number of cases it is situated on the dorsal aspect of the hands and feet; in another category of patients one or more limbs are involved, whereas in a small per cent. of cases it is limited to one-half of the body. Anæsthesia of the entire integument is least frequently met with.

Anæsthesia of the various mucous membranes is frequently encountered, and gives rise to a variety of secondary phenomena. Thus, if the nasal mucous membrane be anæsthetic, irritating substances and tickling fail to cause sneezing. If the conjunctiva be affected it may be touched and irritated by foreign substances without giving rise to a flow of tears or reflex spasm. In anæsthesia of the pharynx and adjacent parts, the membrane in question may be titillated and otherwise irritated without giving rise to vomiting; and if the loss of sensibility be very extensive, taste and smell may be abolished. That the bladder and rectum may sometimes be involved seems probable from the fact that they are sometimes greatly distended by the accumulation of feces and urine, a condition which causes the patient no appreciable discomfort.

The mucous membrane of the vulva and vagina is frequently profoundly anæsthetic. It is this condition which causes that complete loss of sexual appetite sometimes observed in married women, a state of affairs prolific of conjugal unhappiness.

As we have already had occasion to remark, the

special senses frequently become anæsthetic after severe hysterical attacks. Sometimes the sense of smell and taste may be entirely lost; at others the sensory impairment is unilateral. Unilateral and even bilateral deafness are sometimes observed in the absence of all disturbances affecting the peripheral apparatus of hearing.

More or less profound visual disturbances are also encountered among the hysterical; the most frequent of these is probably unilateral amblyopia. Complete amaurosis is, however, also observed. Of ninety-three cases of anæsthesia of different sensory districts examined by Briquet,* amblyopia was present in six instances.

Without entering upon a further consideration of these anomalies of vision, which have been exhaustively discussed by Charcot and others, I will simply observe that examination with the ophthalmoscop usually fails to reveal any noteworthy changes in the disks. The case described by Galezowsky exhibited infiltration and capillary reddening of the disk; but the amblyopia had existed for a long time without opthalmoscopic changes, and it is consequently reasonable to infer that the latter were induced by some unknown intercurrent causes. In accordance with what we already know of the amblitory nature of

* Quoted by Jolly, op. cit.

hysterical symptoms, we are not surprised that both hysterical blindness and deafness sometimes suddenly disappear and give place to other phenomena.

CHAPTER V.

MOTOR DISORDERS.—SPASMS.—PARALYSIS.

Motor Disorders.— The phenomena of motility, like those of sensibility, may be exaggerated or diminished.

Spasms.—These may be of a tonic or clonic nature, and are manifested either as circumscribed twitchings of individual muscles or groups of muscles, or as convulsions involving the motor apparatus, more or less extensively.

When the spasm is located in the pharynx and œsophagus, it gives rise to the sensation of choking known as *globus hystericus*, a term which has been applied to this condition from the fact that the subject complains of feeling a ball in her throat. So convinced are most females of the objective reality of these sensations, that they make the most strenuous efforts to swallow the foreign body, apparently lodged in the throat; and, failing in this, they attempt to dislodge it with the finger, or by the aid of a hair-pin. In certain cases the spasm of the œsophagus may be so severe and persistent in character as to induce the belief that organic stricture is really present. When the spasm extends to the tongue, which occasionally happens, the organ is distorted to such a degree as to greatly interfere with articulation and swallowing.

Sometimes, too, the stomach becomes involved in

the spasm, and, consequently, the retention of food becomes almost impossible, the subject vomiting her food immediately after it had been swallowed. Peristaltic movements of various portions of the intestines, accompanied by borborygm, eructations and colicky pains are sometimes present. When this spasm of the intestine become localized and persistent, stricture may be produced. As a result of this condition the progress of the fœces is impeded, while at the same time, owing to the incarceration of gas above the point of constriction, the bowel becomes so distended as to give rise to the phenomenon known as a "phantom tumor." Sometimes, however the results of the persistent spasm are even more serious, and a veritable intestinal obstruction may occur.

The genito-urinary apparatus may also become the seat of spasm, and in a considerable percentage of cases the latter gives rise to spasmodic retention of urine, which is, curiously enough, associated with a persistent desire to urinate. This desire to micturate is explicable in most cases by an unusually hyperæsthetic condition of the bladder, which may or may not be associated with irritability of the vagina and vulva.

When the hyperæsthesia of the genital organs is great, reflex activity is sometimes increased to such a degree as to render coitus impossible. Under these circumstances the mere contact of the male genital organs with the vaginal orifice is sufficient to provoke severe and painful vaginismus. Concerning the causa-

tion of vaginismus, Scanzoni published some interesting statistics in 1868. These observations have been summarized by Dr. T. Gaillard Thomas* as follows: "During the preceding three years he (Scanzoni) had seen thirty-four marked cases, due chiefly, he thought, to violent efforts at sexual intercourse, practiced upon women having small vaginas and well-developed hymens. Scanzoni found that twenty-five of his thirty-four patients had various functional and organic difficulties. which in twenty cases had come on after marriage; in eleven there was congestive dysmenorrhœa; in one, amenorrhœa had existed for three years; in thirteen, there was chronic metritis; four had either ante or retroversion; in one there was perimetritis; in seventeen, chronic uterine catarrh; in fourteen, vaginal catarrh; in one, anteflexion; in two, retroflexion; nine had urinal difficulties; one had inflammation of the right Bartholin's gland; in fourteen there were symptoms of anæmia; and *in seventeen of hysteria.*" †

And continuing, Dr. Thomas ‡ proceeds to state that: "Although the sexual act could not be fully completed, conception was not entirely impossible, as out of the thirty-four cases two had conceived; in the other thirty-two, sterile marriages had existed from one

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* A Practical Treatise on the Diseases of Women, by T. Gaillard Thomas, M. D., Philadelphia, 1878, p. 143.

† The italics are ours.

‡ Op. et loc. cit.

to eleven years. This sterility was not due to want of sexual desire, but arose entirely from spasm involving all the muscles of the pelvis, which also rendered examination, either by the touch or speculum, impossible without the use of an anæsthetic."

The hysterical attack, which we shall presently take occasion to describe more in detail, is frequently characterized by screaming, crying and laughing of a more or less spasmodic nature. In this connection it is well to bear in mind that the spasmodic closure of the glottis, which sometimes takes place during these seizures, may give rise to dangerous dyspnœa. Consequently, the medical attendant should be prepared to act with energy and precision.

Of diagnostic importance only secondary to globus are the more or less incessant facial contortions, the "facies hysteria" of the older writers—an appearance characterized at once by a certain fulness of the cheeks and a drooping of the eyelids.

Paralysis.—Complete or partial loss of muscular power is frequently present in hysteria. Sometimes the paresis is exceedingly limited in character, involving but one or two small muscles. Thus it is probable that the drooping of the eyelids, so characteristic of hysterical women, is due to weakness of the lavator palpebrae superiosis muscles. In some cases, however, the paralysis is much more extensive, involving one or more limbs, or assuming the form of hemiplegia or paraplegia.

The evolution of these motor disturbances is, in some cases, extremely gradual, the first symptom worthy of note being a sensation of weakness or heaviness in the affected extremities. Sometimes, however, the advent of the paralysis is sudden, and takes place without the slightest warning, usually after an hysterical seizure.

In cases of hysterical paraplegia, in which the muscles of the lower extremities are only partially or slightly affected, the patient is able to walk about by the aid of a cane or crutch; when, however, the motor disturbances are more profound in character, she may be confined to her bed.

With the more or less extensive paralysis of hysteria, anæsthesia is frequently associated. Sometimes cutaneous sensibility is alone affected; but, on the other hand, in not a few cases the anæsthesia extends to the subjacent muscles.

Like so many of the other symptoms of hysteria, these paralytic phenomena are often amblitory and evanescent in character. Sometimes they disappear from one side of the body only to reappear on the other. Sometimes, again, the paralysis may persist for a few days, weeks, or months, and then suddenly disappear altogether. But it would be a mistake to infer from such disappearance that the subject is henceforth exempt from accidents of the kind, since it not infrequently happens that, even after the lapse of several years, the paralytic symptoms again return subsequent to an exceptionally severe seizure.

With regard to the differentiation of the paralytic phenomena of hysteria from true paralysis, resulting from organic lesions, this much may be briefly stated: That hysterical paralysis is, almost without exception, accompanied by the psychical disturbances, hyperæsthesia, spasms, and numerous other manifestations of the disease; so that the evidence afforded is so pregnant that mistakes are usually easily avoided.

After all has been said, however, which the subject admits of, it must be admitted that where the typical hysterical phenomena are slightly pronounced errors are extremely liable to occur. But to admit this fact affords no extenuation for those errors in diagnosis and treatment which are so constantly perpetrated, even where the evidence is most conclusive.

Before concluding the consideration of the motor anomalies of the affection, a word respecting those *contractures* which have been so repeatedly and ably described by recent French authors.*

When tonic spasms in the muscles of the limbs are both severe and persistent, certain distortions of the latter are produced, which may be evanescent or recurrent in character, or may persist for a series of years. If the contracture be situated in the upper extremity, the forearm, hand, and fingers are rigidly

* Vide Charcot, "Lecons sur les Maladies du System Nerveux," Paris, 1872–1873. Also, Bourneville et Voulet, "De la Contracture Hystérique," Paris, 1872.

flexed, so that extension is often impossible. But if the spasmodic condition be present in the lower limb the latter is extended upon the pelvis and the leg upon the thigh. At the same time the foot usually assumes the attitude of talipes equino-varus, while, owing to spasm of the adductors, the thighs are rigidly approximated.

Sometimes these contractures may persist for a series of years and then disappear without other warning than some form of violent mental disturbance. The final result is not, however, always so fortunate; since, after the contracture has continued for a long time, atrophy of the affected muscles may occur. If, under these circumstances, a careful electrical examimation be instituted, it is often possible to demonstrate a well-marked degenerative reaction.

Tremor is sometimes observed to accompany these contractures, and may be evoked by any sudden tension of the muscular system. In exquisite cases the knee-tendon reflexes may be exaggerated. In a case of this kind, in which the contractures had persisted for many years, Charcot* was able to demonstrate, by post mortem examination, sclerosis of both lateral columns of the cord. To infer, however, from this fact that the presence of tremor in these cases is an infallible indication of an organic lesion of the lateral columns is manifestly impossible, since recovery

* Cited by Bourneville, op. cit.

sometimes takes place after the tremulous condition has persisted for a long time. On the other hand it is possible, and perhaps even propable, that in old contractures with atrophy a lesion more or less permanent in character is actually present; and, furthermore, it is even conceivable that such a lesion might extend to the anterior horns of gray matter. Assuming this to be the actual state of things, both the permanent contracture and subsequent atrophy are easily accounted for. Speculations on this point are, however, of little avail in the present state of knowledge; and, in spite of the interest attaching to Charcot's case, a single instance of this kind cannot set at rest a question of such magnitude. Evidence in corroboration or rebuttal is, therefore, in order.

It should be borne in mind, in this connection, that tremor is not, however, necessarily always accompanied by contracture, but may exist quite independently of the latter. I have at present a case of this kind under treatment. The patient, a young man of thirty, exhibits a variety of hysterical mental and physical symptoms, and not the least interesting feature in the case is persistent tremor of the facial muscles, which is also present to some extent in the hands. There is, however, no tremor in the tongue. The tremulous condition, which I have already succeeded in ameliorating to a considerable extent, is excited by insignificent emotional disturbances, and resembles closely the tremor of paralysis agitans.

CHAPTER VI.

VASO-MOTOR DISORDERS—THE HYSTERICAL COUGH.

Vaso-motor Disorders.—These are frequently observed in hysteria, and may consist in a local diminution in temperature—a condtion peculiarly prone to occur in hysterical joint trouble, as Brodie and others have observed; or the vaso-motor insufficiency is exhibited in frequent and unaccountable blushing. Cardiac derangements of a functional nature are also frequent accompaniments of hysteria, and are usually associated with general anæmia.

The various miraculous accounts of hysterical persons, whose wounds "emitted little or no blood," are probably founded upon the observation that bleeding is much less profuse in the anæsthetic regions of such individuals than in other portions of the body. Charcot, I believe, was the first to draw attention to this fact.

Remarkable and sudden elevations of temperature are sometimes observed in hysteria. These thermic variations have been recorded in medical literature by a number of reliable witnesses; so that, although intentional deception has undoubtedly been resorted to in some instances, it must be regarded rather as the exception than the rule. Some of these cases possess great interest from a theoretic point of view.

The Hysterical Cough.—Among the local manifestations of hysteria, to which more or less extended reference has already been made, there remains to be enumerated the phenomenon known as the hysterical cough. It consists in a succession of explosions of air through the glottis, of such rapidity as to cause the impression that the cough is continuous. These paroxysms of coughing are rhythmical in character, and at the same time wholly unaccompanied by expectoration. There is no dyspnœa during the interval; respiration is somewhat less profound than usual, and physical examination of the chest yields only negative results.

As a rule the character of the cough is hard and dry; but in its more complex manifestations it is sometimes accompanied by aphony and vomiting.

The hysterical cough is a chronic affection, remarkable for its tenacity, persisting for months and even for years. It is, moreover, more or less exempt according to Lasègue, from the influences arising from menstruation and other intercurrent events of physiological consequence. The results of treatment are, as a rule, by no means flattering, and recovery usually takes place suddenly and without warning, or by slow and almost imperceptible degrees. In whatever manner recovery takes place there can be no certainty that the restoration to health is permanent, since relapses are of frequent occurrence.

The affection is confined to women, and has al-

most always been observed before the age of five and twenty.*

According to Lasègue it is peculiar to no particular form of hysteria, though Sydenham is of a contrary opinion.†

When the origin of the attack is traceable to a simple cold, the subjects usually exhibit no particular predisposition to catarrhal or pulmonary affections. Upon close inquiry, however, most cases of the kind disclose the histories of previous hysterical attacks, or at all events there is evidence of strong neurotic tendencies.

During the persistence of the cough the appetite is diminished and the digestive functions may suffer more or less. There may also be a considerable loss of flesh. But whatever the general symptoms observed, the latter are rarely of sufficient gravity to justify the anticipation of a fatal termination. Without entering upon the details of the subject further, I will cite a case or two from my own practice and that of others. The following extraordinary case of hysterical cough is reported by Dr. Hartley:‡ "In

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* "De la Toux Hystérique," by Dr. Ch. Lasègue, Archives Générales de Médicine, 1854, vol. I, p. 513.

† Op. cit., p. 517.

‡ Extraordinary case of spasmodic cough in a girl aged fourteen years. Recovery under the influence of valerianate of zinc and the cold douche. The Medical Times and Gazette, vol. II., p. 116.

the end of January last Rebecca D., a tolerably well-developed, dark-complexioned girl of fourteen years of age, came under the care of Dr. Hartley, at University College Hospital, complaining of weakness, loss of appetite, and suppression of the menses. She had menstruated regularly two or three times, and then ceased to do so during the three months prior to her appearance at the hospital. Tonics, both mineral and vegetable, were administered, and the girl went on improving until March 31, when the mother brought her back to the hospital, saying that fourteen days previously she had been seized with a cough, which gradually got worse, until it became almost incessant. In fact, according to the mother's account, the girl never ceased coughing from the time she rose in the morning till the time she went to bed at night. While standing in the waiting room the patient coughed incessantly, and as she was a highly hysterical girl she was kept there for nearly an hour, in order to try and tire her out. But at the end of the hour she was just as bad as when she entered the room. It was one continual round of short barks (she did not give herself time to fill the lungs completely in order to be able to give a proper cough), with no perceptible interval even for respiratory purposes. The mother declared that she could not take food. On being scolded and ordered to cease coughing, she burst into tears; but the cough went on. The patient answered questions hurriedly, and while

doing so she did not cough, but with the last words the cough recommenced. After a time it was found that she could control the cough by an effort of the will, but only for a few seconds. There was no chest affection, and no apparent disease of the throat or fauces. The cough seemed to be entirely spasmodic-laryngeal and the result of hysteria. One of the students counted at intervals the frequency of the cough, and without the patient's knowledge, and it was found that she coughed at the regular rate of seventy per minute, or four thousand two hundred times per hour. And reckoning that the girl coughed during twelve hours out of the twenty-four, if the mother, an intelligent and not at all enthusiastic female, was to be believed, the girl coughed more than that—she must have coughed the enormous number of fifty thousand four hundred times daily(50,400). A mixture containing the valerianate of zinc, the tincture of asafœtida, and camphor was ordered to be taken three times a day, and a cold douche with frictions to the spine to be applied night and morning. On April 7 the patient was again brought to Dr. Hartley, and the mother with evident satisfaction stated that the cough had gradually ceased three days after the commencement of the treatment, and now the patient only coughed once or twice a day. On questioning the mother closely she stated positively that the girl had coughed incessantly, except when she was in bed (it ceased immediately on

lying down), during eight days, and that the cough was just as frequent at home as it was while the patient was in the hospital. So that if we even reckon seventy per minute, and for only nine hours a day, during the eight days she would still have coughed the almost fabulous number of 302,400 times. As the treatment related had proved so successful, it was continued for a fortnight, and then changed to quassia and iron.

The catamenia reappeared on May 19, and from that time the girl went on improving until June 2, when she was dismissed as cured.

The following case came under my observation some years since, while serving a portion of my medical apprenticeship as resident physician to the Hudson River State Hospital for the Insane:

A. C., a girl aged nineteen years, of nervous temperament, was committed to the hospital on account of several mild attacks of what was evidently subacute maniacal excitement. The cause of the last attack was a severe fright caused by threats, on the part of her mother, of sending her to jail if she did not "stop her everlasting coughing."

Upon entrance into the hospital, and while I was endeavoring to record the principal points in her case, she coughed so incessantly and loudly that I was obliged to have her conducted to a remote female ward. On the following day, I learned, upon inquiry, from the attendant that she was menstruating co-

piously, and that she was suffering acutely from dysmenorrhœa. Her conduct was mischievous in the extreme; she called out the window to the patients engaged in work upon the farm, and addressed them as angels; she tore the aprons and other articles of apparel from the persons of the female patients about her, and then ran away laughing and crying in a most hysterical manner. After every explosion of this kind she was seized with violent and continuous coughing, which lasted for two or three hours.

After she had remained in the hospital for some months, it was found that these attacks of coughing invariably began a short time before menstruation and continued until a day or two after the subsidence of the same.*

Examination of the chest and larynx yielded absolutely negative results.

What eventually became of this patient I am unable to state. She was removed from the hospital upon the subsidence of the mental symptoms; but the attacks of coughing remained unaffected up to the time of her departure.

The attacks ceased completely during sleep in this case, a point upon which great stress is placed by some diagnosticians.

***The connection between the menses and the cough is apparently contrary to the experiences of Lasègue and others; though I am convinced from this case of its existence, at least in some cases.**

Dr. Synclair* presents the following case as an instance of the "acute" forms of hysterical cough:

A young girl of eighteen years, having had several attacks of hysteria, complained of rheumatic pains and headache without febrile disturbances. Fifty drops of laudanum mixed with a little water were prescribed for her. On the 22d of October, immediately after the administration of the medicine, the patient was seized with a continuous cough. There was no dyspnœa, no febrile movement and no pain about the throat. At night, while asleep, the cough ceased altogether, but only to return the following morning upon awaking. Thus matters continued in spite of treatment until the fourth day, when the cough suddenly disappeared to return no more.

This case does not appear sufficient to establish the existence of an acute variety of the affection, and I therefore cite it merely on account of the intrinsic interest which attaches to the case, and entirely irrespective of any theoretic significance which it may possibly possess.

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* *Edinburg Medical and Surgical Journal*, 1825.

CHAPTER VII.

THE HYSTERICAL PAROXYSM.

The Hysterical Paroxsym.—By hysterical attacks are commonly understood certain general tonic and clonic convulsions associated with peculiar psychical manifestations.

It is impossible to give a description of these attacks of sufficient breadth to cover the manifold variations of which they are capable, and we shall therefore confine ourselves to a delineation of the more salient features, trusting to the resources of individual experience to fill in the details of the picture.

In the milder forms of the attack there are rhythmical clonic spasms of the extremities, while at the same time respiration is accelerated, irregular, or interrupted. Consciousness, however, is not abolished, since the subject gives evidence of understanding what is said in her immediate neighborhood, and is also able to exercise a certain amount of control over her movements. The duration of an attack of this kind is usually brief, rarely lasting more than a few minutes. Sometimes, however, the primary attack is followed by a rapidly occurring series of others, and we have a somewhat analogous condition to that which is present in certain forms of epilepsy. The course of the attack is, however, by no means always

so benignant in character as the foregoing description would indicate. In the more severe forms of the seizure, consciousness is completely lost; the convulsions become tetanic, the trunk and extremities become fixed and variously distorted; there is frothing at the mouth and the respiration becomes slow and stertorous. The convulsions, which were alternately tonic and clonic in character, resemble so closely those of true epilepsy that the seizure cannot be distinguished from the latter. This close resemblance has gained for these paroxysms the designation of "*Hystero-Epilepsy*," a title which has found favor among recent medical writers of France where a vast literature upon the subject has made its appearance.

Previous to the attack, and indeed throughout the interparoxysmal period, the hystero-epileptic subjects complain of the most varied hysterical symptoms. Hemianæsthesia and hyperæsthesia of the ovaries are among the most constant symptoms observed.

The paroxysm itself is usually preceded by an aura emanating from the affected ovary and proceeding in an upward direction. When the aura has attained the upper portion of the trunk, the subject utters the loud and piercing cry peculiar to epileptics, and falls to the ground in an insensible condition. Tetaniform spasms of the muscles now makes their appearance. The muscles of the neck, trunk, upper and lower extremities, are rigid; respiration is labored and infrequent; the mouth is bedecked with foam, and the

tongue is protruded between the teeth, lending a repulsive appearance to the countenance.

Upon the stage of tetanic muscular contraction, there succeeds a period of complete muscular relaxation, during the continuance of which the breathing is stertorous and the mental condition one of coma. Soon, however, the exaggerated muscular phenomena again make their appearance, this time in the form of violent interrupted contractions, which give rise to the most varied distortions. The body is bent violently backwards and maintained in an opisthotonotic position; or it may be rigidly extended, while the limbs are flexed or extended, or it may be bent forwards or laterally (pleurosthotonos). Sometimes the subject executes gesticulations of an evident purposive nature, which, though in some cases characterized by violence, are quite as often devoid of all injurious intent, and recall forcibly the antics of a harlequin. At such times the patient endeavors to stand upon her head, turns somersaults, or bows with mock gravity to those about her.

By degrees the purposive character of these gestures become more pronounced, and at the same time the emotional element enters more and more into their composition. In the beginning of this stage of the attack, the patient, as a rule, assumes attitudes of a threatening character. The brows are contracted; the lips are compressed and the whole facial expression is one of rage and resentment. Sometimes the

subject suddenly starts from a recumbent posture, and clenches her fists, at the same time fixing a look of defiance upon some unseen enemy. After the lapse of a few moments, however, the attitude of anger is succeeded by one of profound apprehension, which is of short duration and is in turn followed by an expression of countenance indicative of the most beatific hallucinations. The expression of beatitude gradually passess into one indicative of extreme voluptuousness, and is accompanied or succeeded by movements of a correspondingly lascivious nature. This stage is followed by a mental condition resembling somewhat that of delirium tremens. She sees frogs, mice, serpents, rats, and other offensive creatures which causes her to cry out with apprehension, while at the same time her countenance presents a frightful picture of mingled fear and disgust.

By degrees the terrible hallucinations which lie at the root of these phenomena subside; the face of the subject wears an expression of contrition, and with clasped hands she begs for clemency. From this period recovery is rapid. The subject has alternate fits of weeping and hysterical loquacity, during which she upbraids those about her for being the cause of all her distress.

It is very easy to provoke an attack resembling that above described, in a person afflicted with hystero-epilepsy. Thus, the sudden pinching of the skin in the neighborhood of the inguinal region and about the breasts is sufficient to cause a seizure.

Attacks of hystero-epilepsy are much less frequent in this country than abroad, and when they do occur, the phenomena presented are usually greatly modified. Of the causation and pathology of hystero-epilepsy little of a specific nature can be added; the most that we can do so far as active interference is concerned, is to utilize what is known concerning the mechanism of the epileptic seizure, and to make due allowance for the hysterical elements of the picture.

CHAPTER VIII.

HYSTERIA IN CHILDREN—HYSTERIA IN MEN.

Hysteria in Children.—As we have already had occasion to observe, when considering the etiology of the affection, hysteria may occur in girls and boys under ten years of age; but the disease is far more frequent about the time of puberty. In very young girls the appearance of the disease is characterized by alternate laughter and weeping, as well as extreme mental irritability and intellectual inertia. The symptoms manifested by many boys at the time of puberty are analogous in their general characteristics. Besides the mental phenomena, however, the young boys thus affected execute the most extraordinary gestures and gymnastics. They stand upon their heads, creep about the floor, uttering cries in imitation of various animals, and otherwise misdemean themselves. Masturbation is also common in both sexes at this time. The following cases reported by Dr. William Roberts* are good illustrations of hysteria in boys:

* "Cases of Hysteria in Boys," by William Roberts, M. D. A paper read before the Manchester Medical Society, "The Practitioner," 1879, vol. xxiii, p. 339, *et seq.* Vide: also "Cases of Malingering," communicated by Mr. H. T. Batlin, Registrar of the Hospital for Sick Children, London, 1871. "On Hysteria in Children," by Dr. H. Paris, *Journal de Therapeutique*, May 10, 1880; also *London Medical Record*, viii, p. 232.

Case I.—"The first example of hysteria in boys that arrested my attention was the son of a merchant in this town, whom I saw in 1870. This boy at the age of thirteen, and as a sequence to some trifling ailment, began to show hypochondriacal symptoms. He became depressed in spirits, and dyspeptic, and suffered from various undefinable ailments. Eight months later a dry cough set in, which soon assumed the character of the true hysterical bark. I was consulted some four months after this began. The bark had now degenerated into a hoarse sound, resembling the bleating of a goat. The boy persisted for many months in uttering this horrible noise all day long, almost without cessation, except during the hours of sleep. At one time, for about four months, the symptoms exhibited a curious diurnal periodicity. As soon as the boy awoke in the morning he began to bleat every two or three minutes, and continue to do so for about three hours, and then cease; but precisely at eight o'clock in the evening, with the regularity of clock work, he began to bleat again, and continued to do so until he went to bed and fell asleep. These symptoms went on altogether for about fifteen months, and then gradually subsided. Since then this boy has grown into a fine, strong young man. There could be no doubt as to the hysterical nature of the symptoms in this case. The patient was seen by Gendrin, of Paris, and by Sir William Gull, both of whom pronounced the case to be one of pure hysteria. An

interesting episode occurred during the progress of the case. The boy was separated a good deal from his brothers and sisters during the continuance of his ailment, but on one occasion he passed some days in the society of his elder brother. Some four months afterwards this brother had an attack of hysterical barking, which lasted a fortnight and then passed off. A sister also was subsequently seized with similar symptoms. She was nine years of age when her second brother—the subject of this history—was suffering from the above-described bleating. When she reached the age of fifteen, four years after her brother's recovery, she began to "bark" and show other signs of hysteria. In her case the bark became a sort of hoarse growl, which continued almost without interruption for nearly three years, and then slowly passed away. In this family the hysterical bias was distinctly inherited from the mother, who, in her youth, displayed severe hysterical symptoms of the classical type." The subjoined case quoted from the same authority is an illustration of the fact that hysteria is sometimes developed during the period of feebleness which is associated with convalescence from an acute disorder.

Case II.—"The subject was a boy between eight and nine years of age, whom I visited last year with Dr. Mules, of Bowdoin. He was the second child of a family of six. Dr. Mules informed me that three weeks previous the boy was commencing to be conva-

lescent from a febrile attack of doubtful character, when he was suddenly seized with paroxysms of loud, passionate, tearless crying, with incoherent ravings of a most alarming and distressing character. The paroxysms continued for a week almost without interruption. At the end of this week they suddenly ceased, and the boy appeared almost quite well again. In a few days, however, they recommenced, but not so continuously. The paroxysms now lasted two or three hours, and recurred three or four times a day. In the intervals between them the boy appeared quite well, eating and sleeping and amusing himself like a boy in health. When I saw the patient he was in his bedroom, looking calm and collected, with a soft, smiling demeanor. Soon after we had descended into the sittingroom to hold our consultation one of the paroxysms broke forth, and we heard the boy screaming. We went up-stairs into his bed-room and found the boy passionately crying and clinging to his mother, as if in the extremity of terror. Nothing could pacify him, and when we left the house the paroxysm was still proceeding. To my mind the attack had an unequivocally hysterical complexion. What else could it be? The symptoms evidently concerned, and concerned alone, the nervous system; and they resembled those of no disease in the nosological category except those of the chameleon of pathology, hysteria. As these paroxysms had now persisted without amelioration for a period of three weeks, in spite of the resto-

ration of the general health, we decided to send the child away from home, in order to eliminate that most fruitful of all promotors of hysterical manifestations, home surroundings and sympathy. The interrupted galvanic current was also directed to be applied daily. Under this treatment the attacks became less and less frequent, and finally, in about six weeks, ceased altogether; and the boy has since remained in perfect health. I must allow that the diagnosis in this case was not so plain and undoubted as in the preceding, but if any one doubts its correctness, I would ask him this question: Suppose he saw these symptoms in a young girl on the threshold of puberty, what would he call the disorder?"

In the subsequent course of his paper, Dr. Roberts reports cases which he considers to be instances of hysterical contracture and "a clumsy imitation of epilepsy." The ages of the subjects were eight and eleven years respectively.

While I am not prepared to question the diagnosis in these last cases, I cannot help believing that such instances must be comparatively rare, much less frequent in fact than the variety of the affection exemplified in the first two cases. Of that form of the affection, which is characterized by uncouth noises, alternate lachrymation, and spasmodic laughter, I have seen several instances, as well as of that variety of the disease in which the boys run about upon their hands and knees, uttering barks and discordant

howls, or upsetting chairs and other articles of furniture.

*Hysteria in Men.**—It was formerly supposed that hysteria was entirely confined to the female sex; but, as we have already had occasion to remark, in the course of this discussion, recent writers admit that the affection is encountered in the male sex, though far less frequently than among women. In many of the so-called cases of hysteria, however, symptoms of cerebral exhaustion are a far more prominent feature than the purely hysterical manifestations; so that to classify such cases as *bona fide* instances of hysteria would be a manifest error. In all instances where there is doubt as to whether we have to do with a case of hypochondriasis, cerebral exhaustion, or cerebral irritability, the best we can do is to classify the affection according to the characteristics of its most predominant symptoms. This is an axiom which, though it fails perhaps to fulfill the most ideal theoretic exigencies of the problem, will be found eminently useful in practice. I have laid particular stress upon this point in the classification of obscure functional affections of the nervous system in former publications.†

* See "A Case of Aggravated Hysteria occurring in a Man," under the care of Dr. Todd. Recovery. The Medical Times and Gazette, New Series, vol. vii., p. 242.

† "On the Nature of Nervousness," by J. Leonard Corning. The Medical Gazette, New York, Nov. 24, 1883. Also "A Treatise on Brain Exhaustion," by J. Leonard Corning, D. Appleton & Co., 1884, p. 116, *et seq.*

CHAPTER IX.

CAUSATION.—PATHOLOGY.—DIAGNOSIS.

Causation.—Hereditary influence constitutes an important factor in the etiology of hysteria. The affection is, moreover, far more common among females than among males. This preponderance of the disease among women is owing, in great measure, to the increased development of the emotional system in the latter—a state of things which is greatly fostered by the sensational nature of many features of modern social life. But while sensational literature, exaggerated drama, and the innumerable other extravagancies of society undoubtedly play a prominent part it the causation of the disease, it is equally cercertain that morbid states of the sexual apparatus are not without etiological influence. Proof of the truth of this proposition is seen in the extraordinary exacerbation of symptoms, which takes place in hysterical women at the period of menstruation, and in the fact that the first indications of the disease are observed in a large percentage of cases at the age of puberty.

General anæmia, hemorrhage, digestive derangements, and in fact all causes which lower the nutrition of the central nervous system may give rise to hysteria.

All depressing emotions, such as conjugal jeal-

ousy, dread of pecuniary embarrassment, sudden fear and protracted anxiety may induce the affection.

Contusions, even when of apparently trivial import, may cause the disease in those of neurotic constitution; and the concussion incident to railway and other accidents may cause an outbreak of hysterical symptoms in men and women alike.*

I have recently had under my care a gentleman who met with a severe accident on the Long Branch Railway, and in whom, in addition to other symptoms of concussion, these hysterical symptoms were a prominent feature. While sitting in my office he would suddenly shed tears without the slightest apparent provocation; but in an equally short space of time his weeping would be transformed into laughter. When interrogated as to the cause of these manifestations, he could assign no reason, affirming in the most emphatic manner that the weeping and laughter were alike entirely involuntary.

Imitation is a powerful exciting cause of the disease in those of impressionable constitution; it is thus that the "epidemics" of hysteria in recent and ancient times are to be accounted for.

* Vide "On the Concussion on the Spine, Nervous Shock and other Obscure Diseases of the Nervous System," by John Eric Erichsen, F. R. S., etc., New York, 1882. Also, "Injuries of Nerves and their Consequences," London, 1872. And "Lectures on Diseases of the Nervous System," by F. E. Anstie, The Lancet, vol. ii, 1872.

In a large percentage of cases hysteria makes its appearance between the ages of fifteen and twenty-one; though idle and vicious modes of living may cause it to appear in children under ten years of age.

A factor of great importance in the causation of the disease is masturbation, which is far more prevalent among girls than is commonly imagined. The practice appears to be far more prolific of the disease when indulged in by females than by males. I have, however, seen two cases of the affection, both occurring in men over thirty-five years of age, which were directly attributable to this vice.

Pathology.—Post-mortem examinations of the nervous systems of hysterical persons have revealed absolutely no lesion which may be considered as characteristic of the affection. About all that we can do is to submit the various symptoms of the affection to analytical inspection, and thereupon construct as consistent a theory as we are able respecting their origin. In this attempt the physiology of the nervous system will certainly prove our most valuable guide. Following this line of thought, it is evident in the first place, that the greater part of the mental manifestations of the affection are to be regarded as the natural outgrowth of the volitional paralysis and intellectual torpor, which are such characteristic features of the disease. For we find that, as soon as the will and the purely intellectual faculties in hysterical persons are developed by proper methods, the abnormally active

emotions are brought under subjection and there is immediate mental improvement. The essential psychological picture in hysteria is indeed but a complex of riotous emotions. Again the spasmodic phenomena of the affection may be accounted for by assuming an inordinate explosiveness of certain motor areas of the cortex, while the hyperæsthetic manifestations are easily accounted for if we admit a corresponding irritability of the sensory districts.

On the other hand, abolition of irritability in certain motor fibres of the brain and cord might perhaps account for the paralysis; while the anæsthetic symptoms might with equal propriety be ascribed to loss of irritability in some portion of the sensory tract.

It is evident, therefore, from the foregoing, that most of the phenomena of hysteria may be accounted for, if we admit that in this affection cortical irritability is sometimes exaggerated and sometimes unduly diminished or even totally suppressed.

I am fully aware that the foregoing theory is open to criticism, but nevertheless, on the whole it appears to be the most consistent which can be constructed in the present state of knowledge. Jolly* has expressed views with regard to the pathology of the affection, which agree in many respects with those above enunciated; and the same may be said of the theory elaborated by Ross.†

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*Op. cit., p. 490 *et seq*.

† Op. cit., p. 862.

All theories which seek to explain the phenomena of the disease on the assumption of changes in the peripheral nerves are so manifestly inadequate that they require no discussion.

Diagnosis.—Much might be and has been said regarding the various rules to be observed for the purpose of differentiating hysteria from the host of diseases which it simulates. Many of those axioms are, however, far from infallible, as most physicians of large experience can testify. We shall, therefore, abstain from treading the quicksands of these logical mazes, and shall content ourselves instead with a few practical suggestions of more or less universal applicability.

The most weighty diagnostic evidence of hysteria is unquestionably afforded by the characteristic psychical conduct of the patient. If the patient develop extreme mental irritability in the absence of all exciting causes from without, if she has lost volitional control, if her intellectual faculties are devoid of vigor, if she is morbidly hilarious and lachrymose by turns, if she evinces an abnormal and continuous craving for sympathy, and if she resorts to various modes of deception to obtain the latter, we may be reasonably sure that we have to do with a case of hysteria.

The certainty of diagnosis is, moreover, greatly enhanced if, in addition to the foregoing, globus and some of the characteristic sensory and motor derangements are present.

When the local manifestations of the disease are the prominent feature, the most careful physical examination of the affected part should be undertaken in conjunction with the general investigation. We have already alluded to this point when discussing hysterical joint affections.

The determination of the true nature of an hysterical attack is usually simple in uncomplicated cases, especially if the previous history of the patient be accessible. In the more complex phases of the disease, however, it is often impossible to differentiate the attack from the seizure of true epilepsy. This point has been discussed under the head of hystero-epilepsy.

Hysteria is indeed a dexterous counterfeiter of other diseases, but, like most dissemblers, her falsifications will not stand the test of analysis.

CHAPTER X.

PROGNOSIS—TREATMENT.

Prognosis.—In cases of long duration, with a previous neurotic history, the prospects of recovery are decidedly unfavorable; this is especially so when the psychical disturbances are persistent and permanent in character. On the other hand, even violent transitory mental disturbances are not necessarily of bad omen as regards eventual recovery from the purely hysterical symptoms; but it is unfortunately true that these attacks of insanity are liable to leave an ineffaceable trace behind in the form of psychical weakness, and even complete dementation.

When the disease is of short duration and the result of psychical infection (by imitation) the prognosis is favorable, provided that the subject can be properly isolated and placed under appropriate treatment.

Again, when manifest physical debility is the demonstrable cause of the disease, reinvigoration by forced feeding and rest often yields suprising results. It must be admitted, however, that the danger of relapse is always more or less great, unless the subject can be properly protected from the ill-directed sympathy of over-zealous friends.

Fore-warned is, however, fore-armed, and if the

physician, realizing his personal responsibility in the case, presents a true picture of the possible dangers of excessive sympathy to the friends and family of the patient, much future difficulty and annoyance may be avoided.

Treatment.—The proper management of hysterical cases is one of the most complicated problems in the whole range of medicine. In the first place, owing to the imitative qualities of the affection, the conscientious practitioner has much difficulty to persuade himself that he is really confronted by a true pathological condition, and that he is not the victim of deception pure and simple. The fact that hysterical women are, of all others, most prone to prevarication of all kinds, lends force to his scepticism. As a result of this uncertainty of mind the efforts of the attending physician are characterized by a perfunctory observance which is apt to dispel the confidence of patients and friends alike. It is therefore necessary, above all things, to evoke confidence on the part of the patient. This is best accomplished by the adoption of a manner expressive of firmness, but not necessarily devoid of feeling. Above all things, anything approaching exaggeration of manner should be carefully avoided. If the physician be called during the progress of an hysterical attack, he should avoid alarming the friends of the patient by abrupt or unnecessarily harsh injunctions. A very good mode of procedure is as follows:

Cause the patient to be held firmly by those pres-

ent, in such a manner that she is prevented from throwing herself about in a violent and aimless manner. Then, having loosened her clothing, particularly about the throat and neck, cold water may be dashed upon the face until there is undoubted evidence that the paroxysm is over. This is an old but effective expedient. Again, a towel may be dipped in cold water and the face of the patient submitted to a species of mild flagellation. Or, the nose and mouth of the patient may be held closed so as to interrupt breathing—a very effective method of bringing the attack to a speedy termination. Should a faradic battery be at hand the patient may be treated with the wire brush. Care should be observed, however, not to employ currents of too great intensity. Carter has laid down the following rules for treating the attack:

"The attacks will, in all probability, occur during a meal, or when there are strangers present, or at some inconvenient time and place, and it may on this account be necessary to have the patient removed to her bedroom. In such case she should be carried there as quickly as possible, placed upon the floor, and immediately left quite alone, the door being shut, and no one being suffered to open it on any pretext whatever until the patient does so herself. But if the room in which the attack takes place can be spared for a few hours, it should be cleared and shut up in the same manner, and in either case especial care must be taken not to give utterence to a single expres-

sion either of sympathy or alarm. After the lapse of a longer or shorter time, often at a meal, and sometimes not until the next morning, she will present herself as usual, and will perhaps offer some apology, or express some regret for her illness. This should be graciously received; and then every attempt on her part to return to the subject must be carefully and industriously foiled, no inquiries being made about her health, and all complaints being interrupted by the introduction of ordinary conversational topics."

The inhalation of chloroform has been proposed with a view to aborting the attack, and in severe cases some excellent results have been reported. Hypodermic injections of morphia and injections of opium have also been advocated for the same purpose. Except, however, in very severe attacks, these potent remedies should be discarded in favor of the more simple and available means already referred to.

In France the hystero-epileptic phase of attack is much more common than with us, and in this condition Jolly has seen good results from large doses of the bromide of potassium in this tetanic manifestation of the affection.

In very rare cases there is a spasm of the glottis, during the attack, of sufficient intensity to cause grave apprehension. Under these circumstances a sponge saturated with chloroform or ether may be held over the mouth and nose of the patient; or, the physician may pass his finger below the eppiglottis and draw it

upwards. The latter expedient will, however, rarely be required. So much, then, for the hysterical seizure.

But what of the fully developed disease; what shall we do to overcome the multiform manifestations of the hysterical state? To begin with the state of the patient in general, we must endeavor to ascertain some peccant physiological feature which will, in a measure, account, or at all events tend to perpetuate, the unstable condition of the central nervous system. Undoubtedly a most common feature of this sort is general anæmia. The best method of combating this state of bloodlessness when it exists in a hysterical person is by appropriate tonics, and, above all things, by feeding and passive exercise. Should there be an inordinate accumulation of fat as well as lack of blood, we should prescribe massage, general faradization, and plenty of fresh air. Weir Mitchell has, perhaps, understood these matters as well as any recent medical writer. To the medical man who is unacquainted with this gifted writer's contributions to the subject of physiological alimentation, there remains for exploration fascinating chapters in scientific literature.

States of plethora are far more rare in hysteria than those of sanguineous impoverishment. A failure to recognize this fact led among the older physicians to an incredible amount of blood-letting and other depleting measures. As a consequence of such mistaken treatment, many hysterical persons were doubtless

forced into a condition of premature decline, in which the outcome was not infrequently fatal to life itself. In the eyes of modern physiology all this seems incredible enough, and it must indeed be conceded that, if we have not arrived at perfection, we are, at least, far ahead of the preceding generation of physicians in the management of many phases of hysteria.

The relation of affections of the genital organs to hysterical symptoms is a question which is liable to be presented to every practitioner who is brought much in contact with the manifold neuroses which constitute such a baneful feature of the lives of women residing in great cities.

Most authors who have written on hysteria are accustomed to devote much space and ingenuity to a discussion of this interesting conjunction of symptoms. To me all this seems a useless waste of energy. In the first place, I have seen many women suffering from hysterical symptoms, in whom the reposition of a displaced uterus, or the sewing up of a lacerated cervix brought no relief so far as the neurotic manifestations were concerned. On the other hand, I have seen such persons improve in a most wonderful way under treatment by hyper-nutrition, massage, Franklinization, and appropriate moral restraint. By moral restraint I mean removing the patient from the vicinity of friends and family, so that there is no danger of subjecting the patient to the highly prejudicial influence of ill-advised sympathy.

Among the remedies which have been largely employed by physicians in former times in the treatment of hysteria, I would mention galbanum and asafœtida. Since, however, modern physiological research has made itself more generally felt in practice, the tendency to rely upon the specific action of remedies of all kinds has grown progressively less. This applies with particular force to hysteria, where, as we have seen, general hygienic measures are asserting themselves more and more. Among the therapeutic measures of most uniformly good effect is the cold douche or sponge bath. It may be employed where there is an absence of manifest debility, and should always be immediately followed by vigorous frictions.

The anæsthetic manifestations of hysteria may be treated with advantage by daily applications of Faradism, or, still better, Franklinism. The application of metals, magnets, and the like, as recommended by certain French physicians, has no other advantage than the appeal which such devices inevitably make to the titanic imaginative powers of the patient. To me there is a kind of mediæval quackery about such expedients, which has given rise to a feeling of repugnance that I am quite unable to overcome. I am quite willing to thus avow my scepticism in the presence of the general alchemistic state of the whole quuestion of metallotherapy.

Narcotics and even anæsthetics may be resorted to in combating the hyperæsthesia and neuralgia

which are such a tormenting complication of many hysterical cases.

As to the hysterical headaches frequently met with, bromo-caffein, inhalation of the nitrite of amyl, the bromides, and chloral, in considerable doses, will be found useful.

Where paralytic complications are a marked feature, electricity, particularly the static and faradic varieties, should be persistently and systematically employed. On the other hand, when we have to do with spasms, as for instance in persistent *globus*, the constant galvanic current may be employed with advantage. Alternate hot and cold applications also frequently render good service. When the spasm is limited to the stomach syphonage with hot water may be resorted to, provided that the introduction of the tube is attainable without too much nervous shock to the patient. In order to facilitate the entrance of the tube into the larynx, and to prevent spasm in the latter, I have found the painting of the pharynx with cocaine, and the projection of a fine spray of a strong solution of the latter into the upper air passages, an excellent expedient.

When there is spastic or paralytic retention of urine, no hesitancy should be exhibited, the catheter being at once called into requisition. In spraying the upper air passages, as above described, I have incidentally observed that a severe attack of globus may sometimes be arrested in this manner. This, then, is

a brief sketch of the resources at our disposal in the treatment of this most paradoxical, aggravating, obstinate, and obscure neurosis.

As a matter of course the thousand and one little exigencies liable to arise in the course of protracted treatment cannot be separately treated in a work of this kind. Enough that we have given an outline of the policy to be pursued in the treatment of the cases most commonly met with. After all has been said which can reasonably be said, it must in truth be admitted that the personal ascendency which the physician is able to gain over his patient must ever constitute one of the most important, if not the supremely important, factor of successful treatment.

PART II.

EPILEPSY.

CHAPTER I.

CLASSIFICATION.—SYMPTOMATOLOGY.—SYMPTOMS WHICH IMMEDIATELY PRECEDE THE ATTACK.—AURÆ EPILEPTICÆ.

In its typical manifestations epilepsy is characterized by phenomena indicative of disordered sensation, motion, and intelligence. These derangements succeed each other in the severe forms of the disease simultaneously and suddenly; in the milder cases in a certain rhythmical succession, where, as in the least grave variety, only one class of symptoms is represented.

It is customary to divide the phenomena of the disease, according to the nature of the paroxysm, into *epilepsia gravior* or *grand mal*, and *epilepsia mitior* or *petit mal*. Besides these principal divisions, which serve to denominate the more extreme and obvious forms of the disease, recent writers have recognized certain transitional and irregular varieties of the affection, which, in their turn, have received a classification, albeit more or less arbitrary.

In the following description we shall consider

the phenomena of the paroxysm under these headings:

1. Grand mal, that variety of the affection in which the seizure is characterized by coma and general convulsions.

2. Petit mal, that form of the disease in which the paroxysm is alone characterized by loss of consciousness, the convulsive condition of the voluntary muscles being absent.

3. Epilepsy characterized by partial impairment of consciousness and circumscribed muscular spasms. This group constitutes a connecting link between the first two varieties of the disorder.

4. Irregular forms of the attack.

Symptomatology.—We may divide the symptoms of epilepsy into (1) such as precede the paroxysm, (2) such as occur during the paroxysm, and (3) such as are observable during the intervals of the attacks. In the following description we shall follow in many respects the admirable classification of the phenomena of the disease adopted by Nothnagel, a writer whose clear clinical insight is only equaled by his masterly experimental researches upon the pathology of this most interesting disorder.

Premonitory Symptoms.—These may be divided into such as give warning of an impending attack some hours or days before its occurrence, and such as immediately precede the seizure—the so-called *auræ epilepticæ*. The distant premonitions usually assume

the character of mental disturbances in the form of irritability, loss of memory, confusion of ideas, and unusual depression or exaltation, vertigo, and head pains.

Symptoms which immediately precede the Attack: Auræ Epilepticæ.—The aura may affect the sensory, vaso-motor, secretory, motor, and psychical functions. In a considerable proportion of cases the subject is able to give from memory an account of the aura which preceded the attack. Sometimes, however, consciousness is affected so suddenly that the patient retains but a shadowy recollection of the occurrences which immediately preceded the seizure.

The immediate prodromes occur more frequently and exhibit greater variety than the remote warnings; indeed they possess such multifarious characteristics that any attempt at exhaustive enumeration of the phenomena would necessarily be at once imperfect and unnecessary.

In the following description, therefore, we shall simply aim at giving a general account of the characteristics of these premonitory symptoms, trusting to the individual experience of the reader to amplify his acquaintance with this interesting class of manifestations.

The *sensory* aura consists in tickling sensations, or burning, lacerating pains, which usually begin at the extremity of a limb, in the toes and fingers, and extend upward toward the breast and head. Some-

times, on the contrary, a loss of sensation is experienced in circumscribed localities, such as a portion of a limb, or one side of the face. This diminution of sensibility may often be recognized by the aid of the æsthesiometer, or by thermic tests. Again, in a certain percentage of cases, the subject complains of isolated pains in the head, either at the vertex or upon one side of the cranium.

Vaso-motor disturbances manifest themselves by sudden redness or pallor of the affected localities. These circulatory disturbances are, moreover, often preceded by sensations of burning, numbness, or by a chill, which, beginning in the fingers and toes, creeps up the spine toward the head and shoulders.

Acting upon the observation that in certain cases the vaso-motor prodromes assume an unusual degree of prominence, recent authors have sought to distinguish a separate variety of the affection, the so-called *epilepsia vasomotoria.* There is evidently, nevertheless, but scant justifications for such a classification, inasmuch as, if we recognize an epilepsia vasomotoria, we are equally compelled to distinguish a large number of sub-varieties of the affection, according to whether the prodromes are characterized by a predominance of this or that special symptom. It is evidently more logical, therefore, to abstain from attempting to establish further subdivisions of the disease on the score of any mere peculiarity of the aura.

The vertigo and faintness often observed as a

forerunner of the paroxysm are, doubtless, attributable to disturbances of the vaso-motor conditions of the cerebral circulation, and not, as some authors maintain, to dilatation of the abdominal vessels.

The *secretory* aura manifests itself in an inordinate secretion of tears, perspiration, or saliva. Salivation is indeed often enough observed, whereas unusual activity of the lachrymal glands is more rarely met with. Nothnagel has frequently remarked profuse perspiration as an immediate precursor of the attack.

Auræ of the Special Senses.—The auræ of hearing consist of buzzing, roaring, barking, hissing, and ringing. Sometimes sepulchral voices are heard calling in a strange and unintelligible manner, or warning the subject of impending doom. At times also low, musical sounds are heard, which may be gay or melancholy in character. A patient of mine complained that immediately before the attack he heard the notes of a dirge, "and then all was darkness."

Where the auræ are visual, the phenomena consist in colors, flashes of light, and balls of fire. In some cases the subject finds himself surrounded by grotesques or awful shapes, which, with outstretched claws, leer at and mock him. In yet other instances he conceives himself to be in the midst of wild beasts, or hideous reptiles, prepared at any moment to devour him.

Auræ of the sense of smell are usually, though not always, of a disagreeable character. In some cases the patient declares that just previous to the attack he is overwhelmed by the odor of dead animals or cess-pools. Sometimes, however, pleasant odors, such as the perfumes of flowers, are described.

The auræ of taste are characterized by various forms of perversion. Sometimes the patient experiences a salty or metallic taste; at others a sensation of sweetness is noted, which causes him to smack his lips with pleasure.*

The *motor* aura exhibits itself in various ways. In a considerable percentage of cases, tonic, or more frequently clonic, spasms are observed affecting certain groups of muscles. Thus, one side of the face is frequently affected by the spasmodic contractions, whereas in others the spasm begins in the hand and ascends to the face. Sometimes the muscles of the tongue are involved, the subject becoming suddenly speechless. In other cases, again, the muscles of the eyes are implicated, giving rise to squint. These are the cases in which the subjects complain of double vision.

Visceral Auræ.—These are exceedingly common and consist of sensations of heat, cold, rumbling, or straining which are usually referred to some organ contained within the abdominal cavity. The so-called

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* Frank, cited by Nothnagel, has recounted an instance of this sort.

epigastric aura is a sensation referred by the patient to the region of the stomach. The attack is also preceded in some cases by straining at stool and on urinating.

The *psychical* aura is of frequent occurrence, and may consist of an emotional disturbance manifesting itself in fear or disgust, or in derangement of the intellectual faculties assuming the form of confusion of ideas. It is often very difficult to classify this category of phenomena, for the reason that the description given by the patient is so imperfect as to admit of no certain conclusions. Thus, complaints are often made of a strange indescribable sensation of confusion or vacancy, which the patient recalls with evident difficulty. These cerebral phenomena should always be inquired after by the physician, as they constitute an interesting and frequently observed type of premonitory symptoms.

CHAPTER II.

THE MANIFESTATIONS OF THE EPILEPTIC PAROXYSM—GRAND MAL.

Epilepsia Gravior, or Grand Mal.—It is customary among most writers to divide the epileptic attack into two or even three stages. During the first stage of the attack the patient lies in an unconscious condition, and his muscles are thrown into a state of *tonic* spasm. Unconsciousness persists during the second period of the paroxysm, and at the same time the toxic contractions are succeeded by *clonic* convulsions. The third period is characterized by cessation of the spasms and final restoration of consciousness.

It will be well to consider somewhat more in detail these various stages of the paroxysm.

First Stage.—As already noted, there is entire loss of consciousness during this period of the seizure. Sometimes the loss of volitional power is so sudden that the subject falls to the ground, as if stricken by some unseen power. At others, consciousness disappears less rapidly and the patient is enabled to sink upon a chair, lounge, or bed, thus avoideng the danger of falling against some object which might cause him serious injury. It has frequently happened, when the loss of consciousness has been sudden, that patients

have fallen against a stove or even into the fire itself, and have thus sustained frightful injuries. Owing to the profound coma, they feel not even the remotest sensation of pain, and are consequently unable to rescue themselves. When the patient has been under observation, great pallor of the face has been noted, which attains a maximum degree of intensity at the moment the subject sinks into unconsciousness. Some patients utter the so-called *epileptic cry* immediately before falling. This cry is of so strange and piercing a character that animals and men are frequently thrown into a state of consternation upon hearing it. The feelings aroused by this cry, when heard among the wards of an insane asylum, are certainly anything but agreeable, even to those long accustomed to the sound. During or after the fall the muscular system is thrown into a condition of tonic spasm. The distribution of the latter is subject to considerable variation. Sometimes there is opisthotonus; at others but one half of the body is involved and curvature takes place in a lateral direction. In severe cases the spasm is general, involving the entire muscular system. The muscles of mastication are violently contracted, causing the jaws to close with such violence as to break the teeth or produce severe laceration of the tongue, should the latter chance to be implicated. The most varied and hideous distortions are produced; the pupils are dilated and fail to react to light; the eyeballs are deviated and the head and neck are flexed

in a backward direction, or rotated when the action of certain groups of muscles prevails over that of their antagonists. The muscles of both the upper and lower extremities are also involved. The forearm is flexed or extended; the thumb and fingers are bent into the palm; the lower extremities are violently extended and the foot is incurvated. The muscles of the throat and those concerned in respiration are also involved in the spasm, and breathing is arrested. Reflex action is impaired or absent in many cases. As already noted, the tonic contractions are not always so universal as the foregoing description would imply, and in some cases they involve certain groups of muscles only. Nor does the paroxysm always begin with tonic muscular contractions. Sometimes these are wholly wanting, clonic spasms setting in at once.

Second Stage.—As already noted, the prominent characteristics of this stage of the attack are the clonic spasms, which set in in from two to forty-five seconds after the inception of unconsciousness. With the advent of the clonic convulsions a remarkable change takes place in the appearance of the patient. The pallid aspect of the face gives place to a dark, livid hue, while at the same time the veins are seen to be enormously distended. If the radial pulse is examined at this time, it will be found to be feeble or quite imperceptible, though both carotids are seen to pulsate violently. The majority of the muscles of the head, trunk, and extremities are involved

in the convulsive seizure. Owing to the preponderant action of certain groups of muscles over the corresponding antagonists, the most remarkable postures are produced. In a considerable number of cases, one side of the body is seen to be more affected than the other; and this is said to hold true even in those cases where the convulsions are general.* Sometimes the violence of the spasms is so great as to cause dislocations, fractures, and severe wounds of the head and extremities. The teeth are violently ground together, and the tongue, becoming implicated, is severely lacerated. In a large number of cases the patient is seen to froth at the mouth, and the saliva discharged is tinged with blood derived from wounds of the tongue and mucous membrane of the mouth. At the same time the contents of the seminal vesicles, rectum, and bladder may be evacuated, the contents of the latter being frequently ejected with great violence.

This stage of the attack usually lasts from two to four minutes; in some instances, however, the clonic spasms persist five or even ten minutes. The condition of the pupil is variable, being sometimes considerably dilated, at others contracted.

Third Stage.—Usually a cessation of the convulsions is accomplished gradually, but in exceptional cases the spasm ceases suddenly. The spasmodic contrac-

* Nothnagel.

tions grow less and less and finally disappear, respiration is attended with less difficulty, the cyanotic appearance of the face is sensibly diminished, the limbs become relaxed, the pulse becomes stronger, and at length consciousness is more or less completely restored. Sometimes, however, the patient passes from a condition of semi-consciousness into a deep sleep, and does not awaken for hours.

Westphal † has arrived at the conclusion that an elevation of temperature after the attack is rare.

Williams ‡ found that the temperature might rise as much as 3° F. after severe convulsions.

The accounts given by various authors as to changes in the composition of the urine are conflicting.‖

After the paroxysm has subsided the subject usually suffers from great physical exhaustion, mental confusion, derangement of memory, and in rare instances from paresis, or hemi-paresis.

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† "Archiv. für Psychiatrie und Nervenkrankheiten," vol. i.

‡ "Medical Times," 1867, vol. ii.

‖ Vide Ebstein, "Deutsches Archiv. für klinische Medicin, vol. xi.

CHAPTER III.

THE MANIFESTATIONS OF THE EPILEPTIC PAROXYSMS CONTINUED.—PETIT MAL.—SEIZURES CHARACTERIZED BY LOSS OF CONSCIOUSNESS AND LOCAL SPASMS.

Epilepsia Mitior (*Petit Mal*).—This form of the disease is characterized by transitory loss of consciousness, unaccompanied by foaming at the mouth, pulsation of the carotids, marked cyanosis, or manifest spasmodic contractions of the voluntary muscles. Persons subject to attacks of *petit mal* suddenly relinquish the employment in which they may happen to be engaged, remain perfectly motionless for a few seconds, and then resume their former occupation. If engaged, for example, in speaking, such persons suddenly pause in the most unaccountable manner in the middle of a sentence; but, after an interval of a few seconds, conversation is again resumed. If walking upon the street, they suddenly stop, but do not usually fall, unless the period of unconsciousness should be unusually long. In some instances, however, automatic actions are not immediately interrupted, and the patient continues the occupation in which he may happen to be engaged. Thus, musicians have been known to continue playing during an attack of *petit*

mal without the audience becoming in the slightest degree cognizant of anything unusual in their conduct.

In the majority of cases the auræ are entirely absent, or so slight in character as to escape the observation or recollection of the patient. The most common warnings consist in flashes of light, darkness before the eyes, and dizziness. Numerous sensations, already referred to as constituting auræ, may, it is true, occur in the entire absence of true epilepsy. But, when these symptoms occur with a certain periodicity, and are accompanied, moreover, by mental confusion, the suspicion of epilepsy is justified. The diagnosis becomes doubly sure if at such times an involuntary discharge of fæces and urine take place.

In a large number of cases no evil after-effects are observed, and the patient remains entirely oblivious of his previous condition. Sometimes, however, even when the attack has been slight, symptoms are observed which are apparently entirely out of proportion to the magnitude of the exciting cause. The patient becomes dull and sleepy, or suffers from headache, depression or irritability. Memory is also more or less impaired, especially for recent occurrences. These symptoms often persist for several hours; but they do not constitute the entire list of mental accidents to which these apparently insignificant attacks of epilepsy may give rise. Thus, the terrible disorder known as epileptic mania is one of the most common results of these mild attacks of epilepsy. To this point we shall have occasion to refer hereafter.

Epileptic Seizures Characterized by Loss of Consciousness and Local Spasm; Transition Forms.—This variety of epilepsy constitutes a veritable connecting link between the major and the minor forms of the affection. In its general characteristics there is a pronounced resemblance to *petit mal*, with the addition, however, of marked spasmodic phenomena. It rarely happens that tonic and clonic spasms set in simultaneously, or follow each other, as in *grand mal.* In the majority of cases, on the contrary, but one or the other form of spasm is found to exist. The location and extent of the spasmodic phenomena are subject to considerable variation, and to enumerate all the clinical possibilities would be next to impossible. Sometimes the tongue is rolled about from side to side, while the jaws are alternately opened and shut, as in chewing. In some patients, on the other hand, the attack manifests itself merely by spasm of the facial muscles, strabismus, or closure of the eyelids. Again, in a not inconsiderable number of cases there may be movements of the lips, violent contortions of the muscles of the face, local spasms in the extremities, or more rarely in the trunk, and (according to some writers) arrest of respiration, owing to spasm of the respiratory muscles. Where the spasm is located in the extremities there is rigidity of the same, or some of the fingers or toes are extended or bent, or, where the convulsions are clonic in character, the affected parts are moved backward and forward, with a pendulum-like motion. Sometimes

there are clonic and tonic spasms which are more general in character, and which at first sight would suggest the major form of epilepsy. But, as a matter of course, an absolutely sharp demarkation between the various forms is not always easily discernible, and it is consequently necessary to bear in mind the relative value of this or, indeed any other classification.

It has been alleged by some writers that the loss of consciousness is by no means absolute in this form of the seizure. Nothnagel, on the other hand, is of the opinion that in the great majority of cases an arrest of consciousness takes place, which, although often only very transient is still complete.

CHAPTER IV.

MASKED EPILEPSY.

Irregular Forms of the Attack (*Larvated, or Masked, Epilepsy*).—In this form of the disease the paroxysm is quite as well marked as in *grand mal*, the only difference being that, instead of the violent convulsive movements of the latter, certain "automatic" mental and motor phenomena are evolved, which, though often apparently systematized, take place while the subject is in a state of partial or entire unconsciousness.

The following case, which occurred in my own experience, is a good illustration of this phase of the disease:

A. V., a young unmarried woman, aged twenty-five years, was brought to my office about a year ago, suffering, as her friends imagined, from the premonitory symptoms of insanity. On inquiry, I learned that the family history on both the father's and mother's side was good so far as the existence of mental trouble was concerned, and the only neuropathic evidence discoverable was afforded by the girl herself, who complained of being "nervous" and "fidgety," and somewhat lacrymose and emotional at times. These attacks, were, however, in no wise traceable to menstruation.

Upon examination, the organs of the thoracic and

abdominal cavities were found to be in a healthy condition, and, having noted this fact in my case-book, I was about continuing my examination of the patient, when suddenly she arose and, without the slightest warning, spat upon the floor, at the same time dropping her muff, which she had been holding in her hand. For an instant after this she stood with an expression of indescribable horror, as if transfixed, her face meanwhile wearing a chalky appearance. In a moment, however, all was over, and she resumed her seat, as if nothing unusual had happened. The mother of the girl, who was present, began subsequently to reprimand her in the severest terms, at the same time observing, with an expression of exultation: "There, you crazy, nasty thing, the doctor has caught you now, and he will send you to an insane asylum." Upon close questioning, the patient denied in the most emphatic and convincing manner all knowledge of what had occurred, and I am thoroughly persuaded that she told the truth. From her mother I learned that she had formerly had many similiar attacks, during some of which she had shown a tendency to destructiveness, breaking any object upon which she chanced to lay her hands. Several ornaments and pieces of furniture had been destroyed in this way, on account of which she had become very unpopular in her family, the members of which would gladly have seen her relegated to an asylum, as I soon ascertained.

Sometimes the acts perpetrated by persons suffering from this masked type of epilepsy are far more complicated. I can recall a case illustrative of this complex mental automatism, occurring in the family of an intimate friend. The following are the principal points of interest connected with this case:

C. E., a neurotic lad of eighteen, of delicate frame, came under my observation some two years since. The principal reason for consulting me, as his father explained, was because the boy's "memory" seemed to be affected, and because of certain other mental traits which excited the apprehension of his parents and teachers. On questioning the father of the lad, I learned that the latter was in the habit of running away from school and from his home, remaining absent sometimes for days at a time. So annoying had these frequent occurrences become that the parents of the boy had finally been induced to attach a leathern placard to his coat bearing his address as well as a request to the police to return him to his home when found. Indeed, he had been returned by the police on sundry occasions; but the most singular part of the transaction was the fact that he denied in the most obstinate manner all knowledge of his singular peregrinations—a statement which he resolutely maintained in the face of the severest chastisement. This was the more remarkable since his veracity upon all other topics was unquestioned. On examining the lad, I found his back, ankles, and thighs

covered with scars, which upon inquiry I learned were the result of inhuman beatings received at the hands of his guardians, who considered him to be at once a truant and a liar. With tears in his eyes he declared, with the most convincing sincerity, that he had no recollection whatever of the occurrences for which he had been punished.

Such cases as this are far more common than is generally supposed, as doubtless most practitioners of large experience can testify.

CHAPTER V.

"THALAMIC" EPILEPSY. — JACKSONIAN EPILEPSY.—SENSORY EPILEPSY.

Under the designation of "Thalamic Epilepsy," Hammond* has published an interesting case, the chief characteristics of which are "conscious hallucinations, followed by unconsciousness, but unattended by muscular spasm. This form of affection is comparatively rare."

With regard to the frequency of the attack, in common epilepsy, the greatest variations are encountered. Thus, in some cases a year may elapse without the appearance of a single paroxysm, while in other cases the seizures may occur thrice or even half a dozen times daily. Sometimes, again, they exhibit a well-marked periodicity, whereas, in not a few cases no kind of regularity is discernable. In yet another class of cases the subject has hardly time to emerge from one convulsive attack before he is beset by another, the paroxysms following each other in such rapid succession that there is finally no apparent restoration of consciousness between the seizures. This condition is known as the *status epilepticus*—a phase of the disease which has received considerable attention from French writers, notably from

* "On Thalamic Epilepsy," "Archives of Scientific Medicine," August, 1880.

Bourneville.* This writer's subdivision of the condition seems to me, however, unnecessary. The main points to bear in mind are that this form of the attack is, generally speaking, of graver import than the ordinary seizures, that hemiplegia develops in a considerable number of cases, that bed-sores may be developed over the sacrum, and that finally a condition of maniacal excitement with hallucinations, or depression and coma, may succeed the convulsions.

I have seen cases in which from twenty to fifty seizures occurred in the course of twenty-four hours.

The arrest of these convulsions is immediately attained by the application of pressure to the carotids, which is best accomplished with an appropriate instrument.†

So-called "Jacksonian" Epilepsy.—There are certain forms of local or unilateral spasm, occurring usually without loss of consciousness, which have been carefully investigated by Dr. Hughlings Jackson, and

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* "Études clinique et thermométriques sur les maladies du système nerveux," 1873.

† "Prolonged Instrumental Compression of the Carotids as a Therapeutic Agent," by J. Leonard Corning, M. D., "Medical Record" of February 18, 1882. Also "Philadelphia Medical News" of June 17, 1883. "Brain Rest," by J. Leonard Corning, M. D., G. P. Putnam's Sons, New York, 1883. "Carotid Compression," Anson D. F. Randolph & Co., New York, 1882. "Brain Exhaustion," by J. Leonard Corning, M. D., D. Appleton & Co., New York, 1884.

which, in accordance with the views entertained by that observer with respect to their pathology, have found a place in medical literature under the designation of "Jacksonian Epilepsy." Since the spasms in question are almost invariably due to organic intracranial disease, their extended consideration would be out of place in a work of this character. But, since most recent systematic writers are in the habit of devoting some attention to them in connection with the discussion of the pathology of epilepsy, I have decided to give a brief sketch of their principal characteristics, reserving their more extended discussion for a future occasion. While so doing, I can not, however, refrain from protesting against the inconsistency of a pathology which would designate phenomena of this class as epileptic. There is, indeed, no more pathological similitude between these local spasms and true idiopathic epilepsy than exists between the latter and the contractions evoked by the electric current when applied to the motor centers in the cortex.

It is true that Jackson was anticipated by Bravais* as far as the description of these unilateral convulsions is concerned, but it was reserved for the former clinician to thoroughly elucidate the morbid physiology of the affection. The researches of Dr. Jackson in this important field are recorded in a series of papers, which have received a wide and merited attention.

* "Recherches sur les symptomes et le traitement de l'épilepsis hémiplégique," Thèse, Paris, 1827.

"Jacksonian epilepsy" is characterized by the occurrence of partial convulsions, which may be limited to one extremity or to one side of the face, or which, beginning in one extremity, may extend to the other, or even involve half of the body. In rare instances the spasm may extend to the opposite side as well.

As we have already seen, consciousness usually remains unaffected, or, where unconsciousness takes place, it is only evident toward the end of the attack, so that the patient is afterward able to recall what has taken place before and during the greater portion of the seizure.

This form of epilepsy owes its origin to coarse disease situated in or near the cortex. The most frequent cause of the disease is a syphilitic gumma, but localized cicatrices, wounds, tubercle, meningo-encephalitis, and indeed all forms of circumscribed irritative lesions of the cortex, may give rise to the spasms.

When we consider the grave nature of such lesions it is not surprising that the limbs affected by the convulsions may subsequently become the seat of temporary or even permanent paralysis. The latter eventuality is prone to occur where the lesion, which at first may have been merely irritative in character, ultimately destroys that portion of the cortex in which it is situated, or against which it impinges. This association of the unilateral convulsions with secondary paralysis has given rise to the designation often encountered in medical literature of hemiplegic epilepsy

("épilepsie hémipléique"). But why should there be convulsions associated with these profound cortical lesions? Dr. Hughlings Jackson's explanation of this interesting pathological fact is at once ingenious and plausible. He believes that the ganglia in the immediate vicinity of the lesion are kept in a state of morbid irritability, and that consequently they are unduly supplied with blood. As a result of this hyper-irrigation, the ganglion cells absorb an excessive amount of nutriment, so that their superfluous energy finds a vent in sudden explosions, the products of which are the convulsions. These explosions are followed by exhaustion and inertia of the nerve-centres involved, and consequent temporary paralysis of the previously convulsed muscles ensues. As we have already had occasion to observe, however, irritative lesions of this character may eventually destroy the motor centres in the cortex near which they chance to be situated, and with the result of causing permanent paralysis of the muscles over which the centres in question preside.

Sensory Epilepsy.—This variety of the affection has been referred to by Sommers and others, and in a recent article Dr. Allan McLane Hamilton* has recorded several cases illustrative of the manifold phases of this form of epilepsy. In the first case there

* "A Contribution to the Study of Several Unusual Forms of Sensory Epilepsy which are probably dependent upon Lesions of the Occipital Cortex," by Allan McLane Hamilton, M. D., "Medical Record," April 4, 1885.

were sudden hemiopia, supra-orbital neuralgia, unilateral anæsthesia of extremities, tongue, and gums, temporary speech disturbance, and loss of consciousness. In another case there were hemianopsia, frontal headache, hemianæsthesia, temporary mutism, and loss of consciousness.

The researches of Krause, D. J. Hamilton, Starr, Munk, and Wernicke have done much to shed light upon the morbid physiology of these exceptional forms of epilepsy; but, as the discussion is still by no means closed, I shall refrain from entering further into the consideration of this interesting but obscure manifestation.

CHAPTER VI.

CAUSATION.

The most potent predisposing cause of epilepsy is probably found in a hereditary neuropathic tendency transmitted from the father, mother, or both. Sometimes, however, this hereditary tendency is not readily discoverable, owing to the fact that one or even several generations have escaped. This circumstance accounts, doubtless, in a measure for the conflicting statistics adduced in favor of or against the theory of hereditary influence. When carefully collected and impartially interpreted, there can be little doubt, however, that statistics go far to prove the great ætiological importance of heredity in this as in other neuroses. It should be borne in mind, in this connection, that it is not absolutely necessary to trace a series of epilepsies occurring in successive generations in order to prove a hereditary influence. On the contrary, all that is required is proof of the existence in the family of a well-marked neuropathic diathesis, experience having shown that such a morbid tendency may exhibit itself in almost any form of organic or functional nervous disease. Regarding the subject from this standpoint, Herpin* found, out of two

* "Du pronostic et du traitement curatif de l'épilepsie," Paris, 1852.

hundred and forty-three epileptics, well-marked hereditary tendencies in forty-three cases.

The cases reported by Petit* of healthy children occurring in families in which both parents were epileptic have been cited as testimony calculated to destroy the integrity of the theory of hereditary influence. They possess, however, no value whatever so far as the rebuttal of the evidence upon which that theory is founded is concerned, since at most such facts only go to show that one or more generations may escape from the baneful pre-natal influences—a fact already sufficiently understood by all medical statisticians.

Echeverria's opinion that phthisis in the parents has a tendency to cause epilepsy in the offspring seems to us well founded, though controverted by Nothnagel,† who regards the association of the two diseases as explained by the great frequency of phthisis. The fact that a certain condition of instability of the central nervous system is engendered by the malnutrition consequent upon scrofula, anæmia, and chlorosis, and that such an unstable condition often eventuates in epilepsy, is indirect evidence of the correctness of Echeverria's position. Consanguineous marriages also appear to predispose to the occurrence of the disease in the offspring.

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* Gaz. méd. de Paris," 18, 1860.

† Op. cit., p. 202.

Alcohol has been considered an important ætiological factor, but evidence on this point is conflicting. There is no doubt, it is true, that chronic alcoholism and epilepsy are frequently associated; but whether the former is the outgrowth of the latter, or whether the epilepsy is to be regarded as the result of the alcoholic excesses, is difficult of determination.

Age is unquestionably an important predisposing factor in epilepsy. In one hundred and thirty-eight cases analyzed by myself, I found that in 25 per cent. the disease began under eight years, in 51 per cent. between eight and twenty-five, in 13.5 per cent. between twenty-five and thirty-five, and in 10.5 per cent. between thirty-five and fifty.

Gower's* statistics differ somewhat from my own; but since they were derived from the analysis of a larger number of cases, they are perhaps more exact. Of 1,450 cases analyzed by this observer, 12.5 per cent. began during the first three years of life, 29 per cent. under the tenth year, 46 per cent. between ten and twenty, and 15.7 per cent. between twenty and thirty.

Sex has a less obvious influence upon the occurrence of the disease than was formerly supposed. The older writers believed that the disease was more common among males than females, but their views do

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*Vide "British Medical Journal," March 6, 1880, as well as subsequent communications.

not seem to have been derived from a careful analysis of statistics, and are apparently nothing more than arbitrary assertions. As to recent writers, the opinion is quite generally expressed that the disease is more frequent among males than among females, while one or two observers believe that the proportion between the two sexes is about equal. For my own part, I have no hesitancy in expressing the belief that the disease is at least as common among males as among females. Of 72 cases of epilepsy which I have recently seen in asylum, dispensary, and infirmary practice, 41 occurred in men and 31 in women.

It is possible that the relative frequency of the disease in the sexes may vary somewhat with age; but, be that as it may, there is no doubt that in ordinary hospital practice the disease is somewhat more frequent encountered among males than among females.

The factors which may be classed as *exciting* causes of the disease are undoubtedly numerous. We shall, however, discuss only the more frequent and important of the latter, since to attempt to enumerate them all would be alike devoid of theoretic or practical advantage.

In former times much importance was ascribed to sexual excesses in the production of the disease; but in more recent times a reversal of this decision is apparent in some quarters, so that at the present day it is quite in accord with fashion to undervalue, and even to deny altogether, the ætiological importance of this factor.

From my own observations in connection with this matter, I can not help believing that modern writers have been too hasty in their conclusions.

It is an undoubted fact that the great majority of epileptics are addicted to the practice of masturbation, and that the habit is quite as prevalent among female as among male patients. Many recent writers, nevertheless, regard the vice as one of the manifestations of the disease, and not as one of its causes. The question is, however, a difficult one to decide, and arbitrary assertions for or against the proposition are evidently inadmissible. But, after all, the most important question to decide is not whether epileptics masturbate during the disease, on account of the latter, but whether they were addicted to the vice previous to the advent of the epileptic symptoms.

Out of seventy-two cases of epilepsy which I investigated with regard to this point, 84 per cent. afforded histories of excessive masturbation previous to the first paroxysm. In one case localized spasms began in the left hand, after the practice had been continued for about three years, and in course of time the convulsions became general. There were no paralytic symptoms, and the patient, a young man of twenty-eight, denied having had syphilis. In the face of such evidence, I cannot help believing that we are justified in inferring that a causal connection really does exist in some cases between persistent masturba-

tion and the development of that instability of the central nervous system which is so characteristic of the epileptic state. Cases in which the first epileptic paroxysm was developed during coitus certainly lend strength to the argument. The conclusion is indeed inevitable that sexual excesses constitute a far more frequent predisposing and exciting cause of the affection than is admitted by Nothnagel* and other excellent writers.

Epilepsy is frequently evoked by such psychical disturbances as sudden fear, grief, pecuniary and other forms of anxiety, and indeed by all violent appeals to the emotional mechanism. Such occurrences unquestionably constitute some of the prolific exciting causes of the disease; but it is exremely problematical whether the epileptic symptoms would have been evoked were the central nervous system not already in a state of morbid receptivity.

Epilepsy is also prone to develop in the course of or subsequent to the occurrence of the febrile disturbances of infancy. It is also frequently developed after injury to a nerve, or as the result of reflex irritation induced by teething and other causes.

Sometimes the disease is traceable to some cranial injury of such apparent insignificance that it has been speedily forgotten, and only the most careful inquiry serves to elicit the fact. This applies with particular

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* *Op. cit.*, p. 203.

force to young children afflicted with local or general spasms—cases in which we are compelled to rely upon the equivocal testimony of nurses and other ignorant persons. Some of the most severe cases of localized epilepsy (hemi-epilepsy) which have come under my observation occurred in young children who had been dropped by nurses, or had met with some other form of accident at the hands of servants. In all such cases there is probably always more or less indirect injury to the brain, with consequent development of grave organic lesions, though, it is true, there may be no external indication of injury.

Blows upon the cranium are not liable to eventuate in epilepsy, according to some writers, unless they are of sufficient severity to cause unconsciousness. This appears to me an altogether too sanguine view of the matter, since I have seen at least two cases of epilepsy in children which developed soon after blows of so slight a nature as to be almost forgotten. There is little doubt in my own mind that the most insignificant concussion about the head, even when unaccompanied by evidences of abrasion, may, sooner or later, develop epileptic symptoms. This observation applies with particuiar force to infancy and early childhood, when the non-resistent character of the cranial bones facilitates the transmission of sudden shocks to the brain.

Even where no history of a blow is forthcoming, there is strong presumptive evidence that there has

been contusion of some kind. Many cases of epilepsy, occurring after slight abrasions about the head, have been ascribed to "reflex" causes; but it is probable that, in a considerable percentage of such cases, there is more or less direct disturbance of the cerebral substance itself, although some time may have elapsed before the appearance of the first paroxysms. In all such cases great care should be exercised in forming an opinion, as to causation, since the prognosis will manifestly be much less favorable when the paroxysms are traceable to direct injury than when they are really of reflex origin.

CHAPTER VII.

EXPERIMENTAL RESEARCHES.

The most important experimental investigations relative to the pathogeny of epilepsy are those of Marshall Hall, Sir Astley Cooper, Kussmaul and Tenner, Landos. Nothnagel, Brown-Séquard, Westphal, Magnan, Hitzig, and Ferrier.

Before discussing the various theories of the disease, which are directly or indirectly the outgrowth of these investigations, it will be advisable to review the experiments themselves, in order the better to appreciate how much objective matter is really embodied in these hypotheses.

Even among the ancients there is an evident tendency to appropriate the results of the rough experiments at hand to the elucidation of the theory of disease. Thus, Hippocrates* taught that convulsions might arise as well from fulness as from want of blood. He was, doubtless, guided in these statements by observations made upon animals condemned to die in the shambles, coupled, perhaps, with considerations derived from practical experience at the bedside. Kellie,† who made a series of experiments upon sheep, and Pioray,‡ who conducted similar investigations

* "Aphorisms," sec. vi, 48.

†Vide "On Bloodletting," by Marshall Hall.

‡"Archives générales de médecine," January, 1826.

upon dogs, found that copious blood-letting was followed by convulsions. Marshall Hall* and Travers were, however, among the first, if not the first, to note the resemblance between the convulsions produced by rapid bleeding in man and other warm-blooded animals and the spasms of epilepsy.

Although, as already noted, the ancients and older medical writers had formed opinions relative to the *rôle* played by the intra-cranial blood-stream—theories which, even at the present day, bear evidence of a high degree of perspicuity—it is commonly conceded that the fundamental experiments undertaken by Sir Astley Cooper† in 1831 really paved the way for the scientific study of epilepsy. These experiments consisted in ligation of the vertebral and carotid arteries; of both carotid arteries; of both vertebral arteries. Then, ligation of the carotids first and of the vertebrals nine days afterward; of the carotids and subsequent compression of the vertebrals; and, finally, ligation of the vertebrals and subsequent compression of the carotids.

Of these experiments, that in which the carotids were first ligated, and the vertebral arteries immediately afterward compressed, is perhaps the most im-

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* Op. cit.

† "Some Experiments and Observations on tying the Carotid and Vertebral Arteries," by Sir Astley Cooper. "Guy's Hospital Reports," 1836, vol. i, p. 458 *et seq.* The experiment, cited at length, is continued on pages 465, 466.

portant; and I cannot therefore do better than quote the same, in the words of Sir Astley Cooper himself:

"As tying the vertebral arteries is a difficult experiment, it occurred to me that I might compress them with my fingers, after tying the carotids, and produce the same effects.

"I tied the carotid arteries; respiration was somewhat quickened, and the heart's action increased, but no other effect was produced. In five minutes the vertebral arteries were compressed by the thumbs, the trachea being completely excluded. Respiration almost directly stopped, *convulsive struggles succeeded, the animal lost consciousness*, and appeared dead. The pressure was removed, and it recovered with a convulsive inspiration. It lay upon its side, making violent convulsive efforts, breathing laboriously, and its heart beat rapidly.

"In two hours it had recovered, but its respiration was laborious.

"The vertebrals were compressed a second time. Respiration stopped; then succeeded convulsive struggles, loss of motion and apparent death.

"When let loose, its natural functions returned with a loud inspiration, and with breathing excessively labored.

"In four hours it was moving about and ate some greens.

In five hours the vetebral arteries were compressed a third time, and with the same effect.

"In seven hours it was cleaning its face with its paws.

"In nine hours the vertebral arteries were compressed for the fourth time, and with the same effect upon its respiration.

"After thirteen hours it was lively.

"In twenty-four hours the vertebral arteries were compressed for a fifth time, and the result was the same—namely, suspended respiration, convulsions, loss of motion and consciousness. On the removal of pressure, violent and laborious respiration ensued, and afterward the breathing became very quick.

"After forty-eight hours, for the sixth time, the compression was applied, with the same effect."

These experiments of Sir Astley Cooper have shown, then, *that ligature of both carotids and simultaneous compression of the vertebrals give rise to unconsciousness, suspension of respiration, and convulsions.*

Subsequently Kussmaul and Tenner * repeated these experiments in a much more perfect manner upon dogs, cats, and rabbits, and succeeded in conclusively demonstrating that rapid and profuse hæmorrhage is followed by violent and general convulsions. "If," however, "hæmorrhage takes place slowly, and the vital powers are gradually consumed, death ap-

* Moleschott's "Untersuchungen," Band ii, p. 248, 1857. Also "Epileptiform Convulsions caused by Profuse Bleeding," etc.. by Adolf Kussmaul and Adolf Tenner. The New Sydenham Society, London, 1859.

pears then to ensue with swooning, drowsiness, delirium, and vascular irritation without convulsions."

"More than twenty rabbits, which we either killed intentionally by rapid bleeding, or which expired while being experimented upon, died under general convulsions like those observed in epilepsy, and which we shall afterward more fully describe. Not one of those which we saw die bleeding was exempt from convulsions. These convulsions did not differ in any respect from those we observed in several dogs and cats that died from bleeding, or from those described as occurring in men dying from hæmorrhage."*

Kussmaul and Tenner have also shown that an interruption in the conveyance of arterial blood to the brain of a rabbit produces epileptic fits with as much certainty as general hæmorrhage. Referring to the point, they state that "no difference, moreover, could be discerned between the fits observed in death from bleeding and those which occurred in about one hundred rabbits whose carotid and subclavian arteries were tied or compressed below the origin of the vertebral arteries."

And again: "Lastly, we become convinced, by observation of more than a dozen rabbits, that the fits produced by compression of the above-mentioned arteries resemble in every way those brought on acci-

* *Op. cit.*, p. 2, foot-note.

dentally or intentionally in the *identical** animals by profuse hæmorrhage after circulation has been restored to the head."

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* The Italics are ours.

CHAPTER VIII.

EXPERIMENTAL RESEARCHES CONTINUED.

I can not refrain from giving a description of the convulsive paroxysms induced in rabbits after ligature of the great arteries of the neck, in the eloquent language of Kussmaul and Tenner. The quotation is made from the paper already referred to:

"General convulsions usually followed in from eight to eighteen seconds after complete withdrawal of arterial blood. We killed six rabbits solely for the purpose of determining in what space of time convulsions would come on. After the arteries had been laid bare, and the ligatures had been passed round, we allowed the animals to rest undisturbed in an erect position for a quarter of an hour, without making any experiments by compression. One of us then as quickly as possible, tied the left subclavian and innominate arteries, while another, watch in hand, observed the time when the symptoms first manifested themselves.

"In a very strong male rabbit, two years old, general convulsions came on three seconds after the innominate had been tied; and this is the shortest period that we have noticed in any. In two female white rabbits, four weeks old, the convulsions appeared after an interval of twelve seconds; in a female gray rabbit, two or three years old, in ten seconds; in a male of the same age, in sixteen seconds; and in an old strong female, from four to five years old, in forty-five seconds. None of these animals lost during the operations any considerable quantity of blood.

"Out of a hundred strong rabbits, we met with four only

in which, after perfect closure of the above-named vessels, convulsions did not appear till after four to six minutes, and one only, as already mentioned, in which they did not appear at all after the lapse of ten minutes, and until the aorta had been opened."

The occurrence of convulsions is always preceded by various motor phenomena, which have been exhaustively described by Kussmaul.* The most important of these are as follows:

1. "Immediately after stoppage of the blood the various sphincter muscles of the face contract, especially, and in a very striking manner, those of the iris and eyelids; then, in the order of their distinctness, the conchæ of the ears, the nostrils, and the mouth. The jaws, which are generally already closed, become spasmodically locked. Then, usually a little before, but sometimes simultaneously upon the occurrence of general convulsions, the pupils and the fissures of the eyelids, ears, and nostrils are widened, sometimes the mouth also, very distinctly. The adductors of the lower jaw seem also for a few moments to become paralyzed; but during the attack the jaw becomes locked, either uninterruptedly or in broken succession, by the alternate occurrence of spasmodic and more feeble *abductions* and stronger *adductions*."

2. "Convulsive efforts are almost invariably made to turn the pupils toward the internal angles

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* Vide article by Adolf Kussmaul in "Zeitschrift des Würtzburg. phys. med. Vereins."

of the eyes, after which the eyeballs generally roll about, first inward, forward, and downward, then outward, backward, and upward, until at length the pupils are turned toward the external angles of the eyes, and are wholly or partially concealed by the upper eyelids."

3. "The eyeballs are first drawn back into the sockets, and again become prominent as the pupils dilate."

4. "Respiration is at first accelerated, but shortly afterward, a little while before the approach of the general convulsions, it becomes prolonged and deep."

5. "The muscles of the neck generally become paralyzed and unable to bear the weight of the head, which sinks down upon the breast or side, the animals afterward falling down in a swoon on their fore feet, occasionally on their hind ones. The symptoms of paralysis are the more distinct and constant the greater the time that elapses before general convulsions come on."

"The signal for general convulsions is given by a tonic contraction of the muscles of the neck. Then commences a terrible scene, the more surprising by contrast if preceded by swooning. The head is drawn violently backward, the pupil becomes uncommonly enlarged, violent lock-jaw ensues, and the animal, if strong, is generally flung forward with great force to a distance even of from one to two feet, and some-

times over the shoulders of the observer seated before it. The legs are alternately contracted and extended by clonic convulsions in the most violent way; the enlarged pupil appears again fixed in the centre of the palpebral fissure, as the eyeball is again rolled somewhat inward; respiration is scarcely to be perceived, while the heart continues throbbing very vigorously. The clonic convulsions gradually subside, assuming more the appearance of tetanus, and eventually disappear altogether, passing away as they do so from the front to the back. First, the muscles of the neck and fore legs become paralyzed, while the back part of the body is bent forward and the hind legs are tetanically extended until these movements also cease. The duration of these attacks was, according to several observations, from eighteen seconds to two minutes.

"Very frequently, after a pause of from fifteen to seventy-five seconds, a second attack comes on, always weaker and shorter than the first, and often limited to the hinder part of the body, in the form of tetanic convulsions; sometimes, however, affecting the whole body, under the form of clonic convulsions. We once observed such a second attack to last, in an exceptional case, two minutes. Sometimes, indeed, convulsions, in which the hind legs become tetanically stretched, recur even for a third and fourth time, at intervals of from fifteen to thirty seconds. They returned in the strongest and most regular manner in those animals whose arteries were tied forthwith, and whose

strength had not been previously exhausted by experiments of compression. Toward the end of the attacks, urine and fæces were sometimes voided; at other times no such voiding took place, even when the bladder was full.

"In rabbits, cats, and dogs, dying from hæmorrhage, the convulsions are of exactly the same character.

"These convulsions present precisely similar features to those of epilepsy in their complete form, as the following enumeration of the most important symptoms will show:

1. "The animals fall down before general convulsions come on, and completely lose the spontaneous use of their muscles."

2. "They give the observer the impression of their being perfectly unconscious."

3. "Not one of the many animals operated upon cried out, so long as the circulation was interrupted, either before or during the spasmodic attack, and two only while the latter was abating. Subsequently, however, they began to cry piteously directly arterial blood began to flow again, or, at all events, soon afterward. From the want of power to cry, and from the gradual swelling of the veins of the brain during the attack, to which we shall direct attention further on, we infer that spasm of the glottis (laryngismus) took place."

4. "The pupils are dilated during the attacks,

and, to judge from several experiments, appear rigid, the eyeballs being motionless. Before and subsequent to the attacks, however, and when at the very last gasp, the pupils being at the same time very much enlarged, the eyes of some animals that were accurately examined appeared sensible to the influence of light."

5. "The attacks commence with a toxic spasm of the neck (trachelismus.)"

6. "Respiration ceases, while the heart continues beating."

7. "The limbs are seized with strong clonic convulsions, and become at last spasmodically stretched."

Besides the experiments above referred to, Kussmaul and Tenner inaugurated a series of researches which had for their object the more precise localization of the cerebral regions from whence general convulsions arise.*

The *modus operandi* in these researches was as follows: Various districts of the brain were cut out, and a comparison of the effects produced by compressing the great arteries of the head before and after the operation was instituted. In this manner the following conclusions were arrived at: That anæmia of those parts of the brain situated in front of the crura

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*On the Mode of Procedure for Determining the Cerebral Region from whence General Convulsions after Profuse Hæmorrhage Arise," by Adolf Kussmull and Adolf Tenner. "The New Sydenham Soc.," 1859, vol. v, p. 60 *et seq.*

cerebri produces unconscioueness, insensibility, and paralysis, if spasms occur with these symptoms, some excitable parts behind the thalami optici must have likewise undergone some change.*

This portion of their experiments is, however, open to criticism, since the sources of error are numerous. Among the latter, I will only mention the complications liable to arise from opening the skull—a procedure inevitably accompanied by changes in pressure, and, in this case, by escape of the cerebro-spinal fluid, and no little hæmorrhage.

I shall take occasion to refer at length to the further conclusions arrived at by Kussmaul and Tenner relative to the pathology of epilepsy in the subsequent paragraph on the mechanism of the epileptic seizure.

Landois has conducted some interesting experiments, which show the relation of venous hyperæmia of the brain and superior portion of the spinal cord to epileptoid convulsions.†

The mode of procedure in these researches was as follows: The right thoracic cavity was opened and the superior vena cava exposed in such wise that it

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* Vide under head of General Summary, op. cit., p. 105.

† "Ueber den Einfluss der venösen Hyperämie des Gehirns und des verlängerten Markes auf die Herzbewegung, nebst Bemerkungen über die fallsuchtartigen Anfälle," von Dr. Leonard Landois. "Centralblatt für die medicinischen Wissenschaften," p. 146, 1867.

was possible to close the lumen of the same by means of an ordinary artery forceps. Artificial respiration was instituted, in order to neutralize as far as possible the respiratory derangements unavoidably arising from opening one side or the thorax.

Among other phenomena, Landois observed, after closure of the superior vena cava (in the rabbit): 1. Retardation of the heart's action; and, 2, "Complete epileptoid seizures."

The latter observation is one of great importance from a pathogenic point of view, since we are thus made aware not only that cerebral anæmia is capable of producing epileptoid convulsions (as shown by Kussmaul and Tenner), but that profound venous hyperæmia of the central nervous system is equally provocative of the same phenomena.* We can readily understand, moreover, why the convulsions are perpetuated during the second stage of the epileptic attack—that period of the seizure when the brain is evidently in a state of profound venous engorgement.

In 1868, Dr. H. Nothnagel† drew attention to the fact that, although it had long been known that irritation of the floor of the fourth ventricle gave rise to irregular general convulsions, no attempt had been

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* "Die Entstehung allgemeiner Convulsionen von Pons und von der Medulla oblongata aus," von Dr. D. Nothnagel. "Archiv. für pathologische Anatomie und Physiologie und für klinische Medicin," Bd. xliv, p. 1, 1868.

† Op. cit., pp. 146 and 147.

made to locate the district in question with greater precision. That more exact researches in this regard were really necessary was proved by the fact that experiments, undertaken in the light of the popular conception with regard to the "convulsive" functions of the floor of the fourth verticle, frequently failed to produce any spasmodic phenomena whatsoever.

Accordingly, Nothnagel instituted a series of experiments with a view to determining with greater precision the locality in the medulla whose irritation is followed by general convulsions.

The technique of these experiments was extremely simple. The animal was placed upon the abdomen and secured with appropriate appliances. The soft parts were then divided so as to expose the occipital portion of the head between the crista and protuberantia occipitalis. Then the skull was pierced by means of a strong needle (care being taked to avoid the openings for the vasa emissaria Santorini). Finally, penetration of the organs within was effected by means of a fine needle. This procedure was followed by compulsory movements, *general epileptoid convulsions*, or the animal remained perfectly quiet, according to the part penetrated. Confirmatory evidence was subsequently afforded by post-mortem examination.

In this simple manner Nothnagel was able to determine with great exactness the boundaries of what he has expressively termed the "convulsion center" (*Krampfbezirk*). The lower limit of this district is

situated at the upper portion of the *alæ cinereæ;* the upper limit lies somewhat above the *locus cæruleus;* the inner limit is constituted by the outer lateral border of the *eminentiæ teretes;* the outer limit is more difficult to locate, but the upper boundary line appears to be formed by the *locus cæruleus*, whereas, below it corresponds to the inner border of the *tuberculum acusticum.**

The depth of the district is very difficult to determine, as the slightest movement on the part of the hand of the operator causes the needle to penetrate unduly the yielding nervous tissue. When the needle penetrates the above mentioned district (the "convulsion center"), the following phenomena are observed:

"At the moment of penetration severe opisthotonus and tetanic extension of the spinal column take place. Although firmly secured, the animal makes spasmodic movements with the extremities. When released it presents the spectacle of the most pronounced epileptoid convulsions. The extremities are the seat of violent irregular contractions, the posterior being sometimes more affected than the anterior limbs. At the same time the entire animal is thrown from side to side. . . . In from one-half to three minutes the violence of the paroxysms subsides, and the animal remains quiet, but the extremities still continue extended and the spinal column is perfectly rigid." A

* Op. cit., p. 5.

blow upon the table is sufficient to again evoke the convulsions, but the latter sometimes break forth anew spontaneously.

From these experiments, Nothnagel concludes that the central point of departure of general convulsions is to be sought for in the pons. The lower limit of that portion of the central nervous system which is the point of departure of general epileptiform convulsions is represented by a transverse section situated at the lower boundary of the pons.*

These, then, are the experiments upon which Nothnagel has founded his theory of epilepsy. I shall take occasion to again refer to the latter in the subsequent paragraph on the nature of the paroxysm.

In 1850 Dr. Brown-Séquard † succeeded in demonstrating that certain lesions of the spinal cord in mammals are followed in a few weeks by convulsions bearing a strong resemblance to those of epilepsy. After a long series of experiments on guinea-pigs, he found, moreover, that all the lesions of the cord enumerated below are capable of evoking these convulsive phenomena:

1. Complete or almost complete transverse section of one lateral half of the cord

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* Op. cit., p. 9.

† Vide "Comptes rendus de la Société de biologie," 1850, vol. ii; "Archives générales de médecine," 1856, vol. i (v. série, tome 7), p. 143; "Lancet," 1861; "Bull. de l'Academie de méd. de Paris," Jan., mals," etc., 1857.

2. Simultaneous transverse section of the posterior columns, of the posterior horns of gray matter, and of a portion of the lateral columns.

3. Transverse section of the posterior columns, or of the lateral columns, or of the anterior columns alone.

4. Complete transverse section of the cord.

5. Simple puncture of the cord.

Of these lesions, the first two are apparently those which are most liable to develop the convulsive condition.

That portion of the cord situated between the seventh or eighth dorsal and the third lumbar vertebræ is most susceptible to wounds. Lesions of this region are particularly prone to develope the convulsive condition.

In the majority of cases, the convulsive symptoms appear during the third week subsequeut to the lesion.

Sometimes the convulsions appear without the aid of extraneous excitation. As a rule, however, they are readily evoked by irritation of certain circumscribed portions of the integument. That portion of the body the irritation of which causes convulsions has been termed by Brown-Séquard the "*epileptogenous zone.*"

This author has also shown that section of the more important nerve-trunks, such as the internal popliteal and sciatic, and also lesions of the crura cere-

bri or corpora quadrigemina, are particularly prone to develop the epileptic condition.*

The offspring of animals affected by epilepsy caused by lesions of the nervous system may develop the epileptic condition, as Dr. Brown-Séquard has conclusively demonstrated.

A suggestive circumstance in connection with the epileptogenous zone is the fact that the latter is always situated on the same side as the lesion of the spinal cord or nerve; but, when the crus cerebri is injured, it is found on the opposite side of the lesion.

Westphal,† while endeavoring to determine whether the epileptoid convulsions previously described by Brown-Séquard might be determined by certain injuries to the skin, discovered the interesting fact that, when a guinea-pig receives a blow, or a series of blows upon the head, the animal is at once seized with a violent convulsive attack. The convulsions thus induced resemble in every respect those produced by Brown-Séquard in the same animal by injuries to the nerves or spinal cord. The seizure takes place immediately after the blow, or after the lapse of a few minutes. When the convulsions have subsided, the animal appears to recover its normal condition; and attempts to cause a renewal of the

* "Researches on Epilepsy," etc., by Brown-Séquard, 1857. Also articles in journals already referred to.

† "Ueber künstliche Erzeugung von Epilepsie bie Meerschweinchen," Berliner klinische Wochenschrift, No. 38, 1871.

seizure by irritating that portion of the skin which Brown-Séquard has called the "epileptogenous zone" are without avail. A different state of things is, however, observed to exist after the lapse of a few weeks; for, if now the animal is irritated by pinching, particularly in the neighborhood of the lower jaw, an attack of convulsions is immediately produced.

The susceptibility to a convulsive condition evoked by blows is hereditary, like the corresponding state which Brown-Séquard succeeded in establishing by means of injuries to the spinal cord and nerve-trunks.†

Dr. V. Magnan ‡ and M. Challand § have shown in animals that absinthe, when introduced into the system, produces convulsions of an epileptoid character. The following experiment, performed by Dr. Magnan on a dog, is most interesting, as showing the possibility of producing hallucinations as well as epileptic attacks by the administration of absinthe: "In a dog weighing thirty-one pounds, into whose stomach we injected five grammes (about seventy-five minims) of essence of absinthe at 9:15 A. M., we ob-

† Op. cit p. 451.

‡ "On Alcoholism, the Various Forms of Alcoholic Delirium and their Treatment," by Dr. V. Magnan, London, 1876, p. 26.

§ Challand. "Experiments made at the Hôtel Dieu at Professor Behier's Clinique," cited by Dr. Magnan in his monograph on "Alcoholism," p. 26 et seq.

served a first attack of epilepsy at 9:45 A. M.; ten minutes later a second attack occurs, followed by a slight degree of stupor; quickly becoming himself again, the animal continues playful, answers a call, walks and runs easily. Quite suddenly, and without any provocation, he raises himself on his feet, with hair bristling, angry look, eyes injected and brilliant; he fixes his gaze on a wall which is completely bare, and on which there is nothing to draw his attention; bending down with the paws forward and the neck stretched ready to spring, he advances and recoils alternately, barks furiously, and gives himself up to a furious battle; clashing his jaws, and making sudden movements as if to seize an enemy, he shakes his head from side to side, clinching his teeth as if to tear his prey. By degrees he becomes calm, but still looks several times in the same direction, growling, and then regains confidence completely."

Finally, it is worthy of note that both Ferrier and Bartholow have succeeded in evoking epileptoid convulsions by the direct application of the faradaic current to the brain. Convulsions have also been caused by injury to the cortical motor areas.† In all experiments of this nature, in which electricity is employed for the purpose of exciting the nervous sub-

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* Op. et loc. cit.

† "Untersuchungen über das Gehirn," 1864, and other writings of Hitzig.

stance, it should be borne in mind that the localization of the current is a matter of so much difficulty that great caution should be exercised in drawing conclusions as to the relative functional importance of neighboring districts.

Having thus reviewed in succession those experimental researches which are best calculated to shed light upon the intricate questions of pathology involved, it now remains to discuss the mechanism of the attack itself—a task which will be greatly facilitated by the preliminary knowledge at our disposal.

CHAPTER IX.

PATHO-ANATOMICAL FINDINGS.

So various have been the changes recorded by pathologists in epilepsy that, if an attempt were made to construct an explanation of the seizure upon such a basis, it would be found to resemble in intricacy a veritable Gordian knot. There is, in truth, hardly an organ in the entire body which has not been found diseased in this affection. Ignoring the morbid changes in the viscera, which are evidently of collateral importance, it will be well for the completeness of the argument to bestow a glance upon the more striking appearances found in the brain, medulla, and the remaining portions of the cord, and their appendices.

First of all, then, it has been affirmed that the weight of the brain is increased in epilepsy;* but, on the other hand, equally positive statements are at hand which go to show that, in some cases at least, the weight of the organ is decreased.†

Unequal proportions of the two hemispheres has also been alleged, but is certainly by no means so frequently met with as was formerly supposed.

Meynert and others have found sclerosis of the

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* Echeverria, "On Epilepsy," New York, 1870.

† Meynert, "Vierteljahrasschrift für Psychiatrie," 1867.

cornu Ammonis, but I believe he rightly considers this change of secondary origin only. But I would go a step further and maintain that the lesion in question can not possess the slightest importance whatever, so far as the development of the paroxysm is concerned, since, when this portion of the brain is removed, convulsive phenomena are neither evoked nor increased when they already exist.

Without entering upon a recapitulation of the various tumors which have been found associated with epileptic phenomena, I will content myself with enumerating some of the further and more obvious changes about the cord and brain which have been noted within the last few years: (1) atheroma and aneurism of blood-vessels; (2) dilatation of the vessels of the superior portion of the cord; (3) temporary or permanent anæmia of the brain, resulting from general causes or from local vaso-motor insufficiency; (4) increase in quantity of the cerebro-spinal fluid; (5) thickening of the meninges of the brain.

Of these changes, the latter must be regarded as of most importance, since it is found in a considerable number of cases. But, though cortical function is interfered with in all true cases of epilepsy, it would be a decided mistake to ascribe such alterations to meningeal changes, since in a by no means insignificant number of cases neither they nor indeed any other morbid appearances are discernible, even upon the closest and most improved methods of scrutiny.

There is consequently no question in my own mind that, where these evidences of meningitis do occur, they are, like most of the other changes recorded, to be regarded as of purely secondary origin—to be accounted for, perhaps, by the violent circulatory fluctuations which are so characteristic of the disease.

Still, when once established, these thickened membranes have an undoubted influence upon the prognosis. Thus, in three cases of severe epilepsy, with psychical complications, in which I have made post-mortem examinations, these thickened and adherent members were a prominent feature. In such cases there is, I believe, little or no chance of either recovery or benefit, since the derangements in cortical nutrition caused by such lesions must of necessity be profound in character, and practically irremediable.

CHAPTER X.

THE MECHANISM OF THE EPILEPTIC SEIZURE.

Enough has already been said concerning the various morbid anatomical findings in epilepsy to prove conclusively that there is absolutely nothing either characteristic or constant in their occurrence. Consequently, if epilepsy is to be regarded as a malady *per se*, and not as a mere symptom of multitudinous forms of central nervous disease, we must look elsewhere for an adequate explanation of the true nature of the affection. Undoubtedly the most consistent theory of the disease is based upon considerations derived from experimental physiology and pathology.

Without anticipating further, however, it will be well to review briefly the more prominent hypotheses relative to the nature of the disease which have been advanced by various writers on the subject from time to time.

According to Marshall Hall,* the mechanism of

* The following are the principal writings in which Marshall Hall has embodied his views relative to the pathology of epilepsy: "Essays on the Theory of Convulsive Diseases and Derangements of the Nervous System;" "Synopsis of Cerebral and Spinal Seizures of Inorganic Origin and of Paroxysmal Form;" "Synopsis of Apoplexy and Epilepsy, with Observations on Trachelismus, Laryngismus, and Tracheotomy," 1852; "On the Neck as a Medical Region," "Lancet," 1849; "Memoirs on the Nervous System," London, 1837.

the seizure may be formulated somewhat as follows: (1) excitation of a sensory nerve or direct central excitation, which gives rise in the first place to reflex spasm of the muscles of the neck, causing compression of the cervical veins with consequent comatose symptoms; and, secondly, to a reflex tonic spasm of the muscles of the larynx, closing of the rima glottidis (laryngismus), causing asphyxia with consequent convulsions. In other words, the condition of unconsciousness is ascribed to venous engorgement, and the convulsions to general asphyxia.

Plausibility was lent to that portion of the theory which assumes contraction of the muscles of the neck as the cause of the venous stasis by the experiments of Reynolds. This observer found that contraction of the cervical muscles actually did produce stasis of the veins of the neck, with concomitant cerebral disturbances. But, on the other hand, Kussmaul and Tenner* have shown, by conclusive experiments, that occlusion of the larynx is capable of producing both coma and convulsions. As a consequence, they refuse to accept the first portion of Hall's theory. It may be well to add in this connection that both of these observers, guided by clinical and experimental data, arrived at the conclusion that the phenomena of the affection, and particularly the unconsciousness, could

* "On the Nature and Origin of Epileptiform Convulsions caused by Profuse Bleeding," by A. Kussmaul and A. Tenner, "New Sydenham Society," 1859.

not be accounted for by any merely local anatomical lesion, since the concomitant participation of the cerebrum was evidently a *sine qna non.* Moreover, they conclude that it is not necessary to assume a constant or gross change appreciable by the pathological anatomist, but that a pervasive functional change of transient duration is sufficient to account for the phenomena of the ordinary epileptic seizure. Such a pervasive, transitory change they perceive in cerebral anæmia—a condition which, as is well known, constitutes a prominent feature of the first portion of the epileptic attack. Besides this clinical fact, they adduce the evidence afforded by their own experimental researches, to which extended reference has already been made, by which it was conclusively shown that, when the brain of an animal is suddenly deprived of arterial blood, either by ligation or compression of the four great arteries which supply the brain, or by bleeding, epileptic convulsions and coma are invariably produced.* These observers also endeavored to cause

* These researches, as we have already seen, were, to a certain extent, anticipated by Sir Astley Cooper (vide "Guy's Hospital Reports," vol. i, 1836), who succeeded in demonstrating upon rabbits that ligation of both carotids and compression of the vertebrals gave rise to convulsions, suspension of respiration, and unconsciousness. The experiments of Kussmaul and Tenner were, however, more thorough, and were conducted upon cats and dogs as well as rabbits (vide Moleschoot's "Unterrsuchungen," 1857, Bd. ii, pp. 247, 248 et seq.; also, "Epileptiform Convulsions caused by Profuse Bleeding," by Adolf Kussmaul and Adolf Tenner, "The New Sydenham Society," London, 1859).

convulsions by faradization of the sympathetic nerves. Only in one case, however, were their efforts successful; but, had the interrupted galvanic current been employed, it is possible that more uniform results might have been obtained. These failures are, however, not to be accepted as absolutely negative, or as fatally damaging to the general argument advanced by these gentlemen, since their experiments with arterial compression and ligation served to show that the profound cerebral anæmia resulting therefrom invariably evoked general convulsions and unconsciousness.

But, while recognizing the important part played by cerebral anæmia in the *immediate* production of the epileptic attack, Kussmaul and Tenner do not fail to note that behind all this there must be an ultimate morbid state—an epileptic "condition" or an epileptic "affection" which is responsible for the occurrence of all the phenomena concerned in the production of the seizure. In speaking of this "proximate" or ultimate cause of the attack they proceed to state "that the proximate cause of the attacks can not be one of long duration, but an alteration merely of a temporary kind. . . . It must be quickly developed to its full extent, and pass during the attack through its different phases, and, when the latter are over, cease completely or nearly so. How otherwise is it reconcilable that, after an attack, the patient so frequently, and often for so long a time, recovers the

full use of the action of the brain?" And again: "It can be no visible alteration of the brain, anatomically demonstrable, that can act as the proximate cause of an epileptic attack. . . . Every physician of the present day, who is at all judicious, will relinquish the hope, cherished with childish confidence by certain schools and times, that pathological anatomy is destined to give an explanation of the nature and seat of epilepsy, and he will only expect that result from the progress of the experimental physiology of the nerves. Material alterations in the brain and its membranous and osseous coverings are, it is true, most frequently found in those who have died from epilepsy and eclampsia, and are often enough recognized as the cause during life. Often, however, in spite of most careful examinations, no anatomically demonstrable alterations are found in the structure of the brain, and those which do exist must be generally regarded, especially in epilepsy, as produced by interruptions to the circulation and nutrition during the attacks, particularly if the latter have frequently been repeated and for a long time. Most of the patients suffering from this disease for years afford the usual appearances found in chronic diseases of the brain. . . ." But "not one of all the anatomical alterations in whose train epilepsy frequently appears—such as cicatrices, tubercles, and atrophy of the brain, or premature coalescence of the sutures of the skull, with lessening of its cavity—leads invariably to this disease."

The "disposition," then, "is nothing else but that state of the brain which forms the basis from which the attacks arise, and can scarcely be conceived of otherwise than as a very slight alteration of the whole brain, or of a narrowly circumscribed district, while the alteration which is the cause of the attacks must always affect the whole substance of the brain, or at all events the greatest part of it, and that, moreover, in an energetic manner."

The following is a general summary of the more important conclusions which Kussmaul and Tenner derived from their long series of experiments:

1. "The convulsions appearing in profuse hemorrhage of warm-blooded animals (including man) resemble those observed in epilepsy."

2. "When the brain is suddenly deprived of its red blood, convulsions ensue of the same description as those occurring subsequent to ligature of the great arteries of the neck."

3. "Epileptic convulsions are likewise brought on when the arterial blood rapidly assumes a venous character, as, for example, when a ligature is applied to the trachea."

4. "It is highly probable that in these cases the attack of spasms depends upon the suddenly interrupted nutrition of the brain. It is not caused by the altered pressure which the brain undergoes."

5. "Epileptic convulsions in hæmorrhage do not proceed from the spinal cord."

5. "Neither do they proceed from the cerebrum."

7. "Their central seat is to be sought for in the excitable districts of the brain lying behind the thalami optici."

8. "Anæmia of those parts of the brain situated in front of the crura cerebri produces unconsciousness, insensibility, and paralysis in human beings; if spasms occur with these symptoms, some excitable parts behind the thalami optici must have likewise undergone some change."

9. "Anæmia of the spinal cord produces paralysis of the limbs, of the muscles of the trunk, and of respiration. When the anæmia suddenly attains its greatest intensity, then only, and even then but rarely, do slight trembling of the limbs precede paralysis. The sphincter ani acts analogously to the constrictor muscle of the face in anæmia of the brain—that is, it contracts spasmodically before it relaxes."

A more explicit account of the experiments from which Kussmaul and Tenner derived these conclusions has already been given in the paragraphs on "Experimental Researches." These experiments constitute, without doubt, one of the most brilliant chapters in the whole range of experimental pathology, and it is difficult to conceive how a theory of epilepsy possessing the slightest title to consistency could have been formulated had they never been undertaken.

While it is doubtful whether some of the opinions

expressed by these gifted authors can at present receive unqualified indorsement, there is no denying the great perspicuity displayed throughout the entire argument. When interpreted, moreover, from the broad standpoint of more recent scientific acquisitions, their importance to scientific medicine can hardly be overestimated.

Finally, I will add that I have been able to confirm many of the statements and conclusions of Kussmaul and Tenner by researches conducted on human beings. As I shall have occasion to refer at some length to these researches in other portions of this article, I will content myself with merely indicating the titles of the more important papers and monographs in which they are embodied.*

* Vide "Medical Record," February 18, 1882. Article on "Sleep," "Medical Record." July, 1872. Monograph on "Carotid Compression," Anson D. F. Randolph & Co., New York, 1882. Paper read before the New York Neurological Society, June 6, 1882, and subsequently published in the "Philadelphia News" of June 17, 1882, and also in the "American Journal of Neurology and Psychiatry," 1882. A paper on "Electrization of the Sympathetic and Pneumogastric Nerves, with Simultaneous Bilateral Compression of the Carotids," "New York Medical Journal," February 23, 1884. Monograph on "Brain Rest," G. P. Putnam's Sons, New York, 1883. A treatise on "Brain Exhaustion," with some preliminary considerations on cerebral dynamics, by J. Leonard Corning, M. D., D. Appleton & Co., 1884. "The Electro-mechanical Tonus of the Cortical Blood-vessels," a paper read before the New York Neurological Society, and subsequently published in the "Medical Record," February, 1885.

Nothnagel,* as we have already seen, has formulated a theory of the paroxysm, which is the outgrowth of a series of experiments performed with the object of determining the rôle played by the medulla oblongata and pons varolii in the evolution of general convulsive phenomena. In the course of these investigations this observer ascertained that there is a limited spot in the floor of the fourth ventricle, the irritation of which (with a needle, etc.,) causes tonic and clonic spasms of the entire system of voluntary muscles. This spot has been appropriately designated by him as the "convulsion center."

According to Nothnagel's theory, the convulsions of the epileptic paroxysms are due to irritation of this circumscribed locality.

But, while such irritation is sufficient to evoke the spasms, it is not adequate to account for the unconsciousness. Accordingly, to overcome this difficulty, Nothnagel assumes a concomitant irritation of the neighboring vaso-motor center. As a result of this irritation the arteries of the brain, as well as those of the rest of the body, are contracted, causing anæmia; and it is to this cerebral anæmia that the unconsciousness is due. The co-ordinate excitation of the vaso-motor and "convulsion centre" constitutes, then, according to this theory, the essential pathological feature of the typical paroxysm.

* "Uber den epileptischen Anfall," von H. Nothnagel. Volkmann's "Sammlung klinischer Vorträge," Leipzig, 1872.

But, while this is assumed to be the course of events in typical cases, it does not serve to explain the occurrence of variations in the character of the seizure.

Accordingly, with a view to rendering the theory as broad as possible, Nothnagel furthermore assumes that the centres above referred to are in a certain sense independent of each other, so that one may be irritated without the other. Thus, when the "convulsion center" is irritated alone, the paroxysm is characterized by convulsions without unconsciousness; whereas, when the "vaso-motor center" is excited mental disturbances and loss of consciousness are the prominent features.

This is certainly an ingenious method of avoiding a logical dilemma; but, unfortunately, the extreme contiguity of the two centres renders their independent irritation exteremely improbable, since any morbid changes affecting the one would be practically certain to involve the other.

CHAPTER XI.

CONCERNING THE NATURE OF THE IRRITATION —THEORIES OF NOTHNAGEL, TODD AND HUGHLINGS JACKSON.

With regard to the *nature* of the irritation which calls forth the activity of the above-named centers, Nothnagel confesses that little can be said with certainty.* He believes, however, that *in epilepsy* "the convulsions do not depend upon an anæmia of the pons, acting as an excitant upon the convulsion centre;"† though admitting that anæmia of the pons *can* occasion convulsions, as shown by certain of Kussmaul's experiments.

As to the second stage of the attack, Nothnagel believes that the intense venous hyperæmia is attributable to the violent contractions of the muscles of the neck, which, pressing upon the large veins, impede the return of the venous blood to the heart. The continuance of unconsciousness, as well as the convulsions, are to be ascribed to this venous hyperæmia, one of the effects of which is to cause irritation of the "convulsion center."

It now remains to consider briefly that theory of

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*Von Ziemssen's "Cyclopædia," article "Epilepsy," by H. Nothnagel, vol. xiv; p. 269, seventeenth line from the top.

†Op. cit., p. 268.

epilepsy which ascribes the essential feature of the disease to a discharge or explosion of nerve force. Dr. Robert B. Todd* was the first to regard the disease from this point of view. It is impossible to read the paper in which this gifted writer formulates his views upon this, one of the most intricate chapters in pathology, without experiencing a sense of admiration for the perspicuity and logical adroitness displayed.

Dr. Todd considers that the abnormal explosiveness of nervous tissue, which is the principal factor in his theory of epilepsy, is due to the gradual accumulation of a morbid material in the blood. This foreign substance finally becomes so abundant as to cause the discharge of nerve force from the brain, by which the phenomena of the fit are produced.

This theory of epilepsy was suggested to the mind of Dr. Todd from the fact that the disease occasionally occurs with renal affections. "Upon this fact of the dependence of attacks of epilepsy upon renal disease," he says, "I have been enabled to construct a theory of the cause of epileptic fits generally." Continuing the argument, he adds: "I hold that the peculiar features of an epileptic seizure are due to the gradual accumulation of morbid material in the blood, until it reaches such an amount that it operates upon

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*A Clinical Lecture on a Case of Renal Epilepsy, and on the Treatment of Epilepsy in General," by Robert B. Todd, M. D., Medical Times and Gazette, Aug. 5, 1854.

the brain in, as it were, an explosive manner; in other words, the influence of this morbid matter, when in sufficient quantity, excites a highly polarized state of the brain, or of certain parts of it, and these discharge their nervous power upon certain other parts of the cerebro-spinal center in such a way as to give rise to the phenomena of the fit. A very analogous effect is that which results from the administration of strychnine, which is best seen in a cold-blooded animal like the frog. You may administer this drug in very minute quantities for some time without producing any sensible effect; but, when the quantity has accumulated in the system up to a certain point, then the smallest increase of dose will immediately give rise to the peculiar convulsion phenomena. The animal is thrown into a series of paroxysms of opisthotonos, which exactly imitate the phenomena which we often witness in tetanus, as it affects man and some of the higher animals."*

This, then, is Dr. Todd's conception of the causation of the paroxysm—the so-called humoral theory of epilepsy.

The theory enunciated by Dr. Todd has been modified and developed by Hughlings Jackson.† According to Dr. Jackson, epilepsy, "defined from the paroxysm, is a sudden, excessive, and rapid discharge of gray matter of some part of the brain; it is a local

*Op. et loc. cit.

† "West Riding Lunatic Asylum Medical Reports," 1873.

discharge. To define it from the functional alteration, we say there is in a case of epilepsy gray matter which is so abnormally nourished that it occasionally reaches very high tension, and therefore occasionally explodes. The two definitions are different faces of the same thing."

The discharge, beginning at the cortex, is propagated along the course of the centrifugal nerve channels. As to the loss of consciousness, Dr. Jackson feels justified in ascribing it to the transitory exhaustion of nervous energy, consequent upon the previous inordinate discharge.

The fact that in a considerable number of epileptics the paroxysm is ushered in by a psychical warning, or an aura of special senses, has been urged as strong evidence in favor of the proposition that the discharge begins in the convolutions. And, in truth, it must be acknowledged that it is difficult to conceive how a primary functional implication of the medulla or pons Varolii could evoke phenomena which, by common consent, are conceded to be the expression of the activity of the highest centres.

According to this theory, then, the protoplasm of the ganglion cells is in an unstable, super-explosive condition, attributable, perhaps, to excessive nutrition (as the result of expanded blood-vessels, etc.). Jackson has not, however, remained content with explaining the *modus operandi* of the ordinary epileptic paroxysm, but has also sought to render his theory suffi-

ciently comprehensive to account for the evolution of irregular forms of the attack. Accordingly, it is assumed that in one class of cases certain portions of the gray matter may be affected, while in a second class of cases other portions may be involved. The various modifications of the seizure are, therefore, explained by a consideration of the physiological properties of the group of nerve-cells involved in each case.

While heartily indorsing the main features of this theory, I cannot accept it in all its details, for the very excellent reason that cerebral physiology is not as yet sufficiently developed to admit of such pathological refinements.

CHAPTER XII.

PROGNOSIS—TREATMENT.

From the very earliest periods of recorded history epilepsy has been regarded as a grave disease. Doubts of its curability have been expressed, even at the present day; this, however, according to such excellent authorities as Herpin and Nothnagel, is the extreme of pessimism and is not sustained by clinical experience.

When the disease begins early in life, say before the eighteenth year, the prognosis, all things being equal, is more favorable than when the disease comes on late in life.

In those cases where the first attack is traceable to a peripheral cause, the prospects of recovery, provided we succeed in removing such cause, is greater than when we have to do with a gross central lesion.

Long intervals between the attacks are considered of favorable import by some, but by others they are believed to presage a doubtful recovery.

The character of the seizure has no great influence on the prospects of recovery; and in forming an opinion on that question we may apply about the same course of reasoning to a case of *grand mal* as to one of minor epilepsy.

The principal methods of treating the disease in

vogue at the present day resolve themselves into surgical procedures (medicinal) measures and dietetic expedients.

By resort to surgery we remove an offending cicatrix, the irritation emanating from which may cause the explosive condition resulting in the seizures. The same means also enable us to elevate a depression in the skull, and to remove by the aid of the trephine irritating substances from the surface of the meninges. Happy results soon followed such applications of surgery; but unfortunately the number of cases susceptible of such treatment is relatively small, so that in the majority of cases we have to rely upon the introduction of chemicals into the system, and upon careful regulation of the diet to prevent or diminish the frequency of the seizures.

The chemicals which have been employed as medicines in the treatment of epilepsy are legion. Among those which, at one time or another, have enjoyed a wide celebrity I would mention the following: Valerian, wormwood, hyoscyamus, belladonna, oxide of zinc, nitrate of silver, and in the form of inhalations, chloroform, ether, and the nitrite of amyl. During the last ten years the bromides have become the fashionable remedies in epilepsy. At one time great things were expected from electricity, and while these expectations have not been entirely realized, it must be conceded that great benefits are occasionally witnessed from the application of the constant galvanic current

about the head. I, myself, have frequently witnessed diminution of the number of seizures subsequent to prolonged applications of weak galvanic currents to the head. The faradic current, on the contrary, is of no particular use even in the treatment of epilepsy.

The first question which naturally suggests itself to the physician in connection with the treatment of epilepsy is: "What shall we do when the attack has already begun?" We answer, if the attack be of brief duration, a masterly inactivity is the prime desideratum. But if, on the contrary, we have to do with the status epilepticus, with one seizure following the other in rapid succession, we should by all means abate the attack. This may be attained in almost all cases by applying firm pressure to the stems of both common carotid arteries with the fingers, or, better still, with one of the instruments which I had constructed several years since for the purpose.* The implement in question consists, in the first place, of two curved metallic branches, resembling in shape an inverted horseshoe. At each of the extremities of the horn is a small padded piece of metal, which may be set at an angle by means of a key. The object of this arrange-

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* "Prolonged Instrumental Compression of the Primitive Carotid Artery as a Therapeutic Agent," by J. Leonard Corning, M. D. The Medical Record, Feb. 18th, 1882. Also "Carotid Compression." Ibid. Anson D. F. Randolph & Co., New York, 1882.

ment is to permit of so arranging the pads that the artery is pressed away from the jugular vein, in the direction of the spinal column. The toe of the horseshoe is, furthermore, so secured to a handle by pivots that by rotating a screw the arms of the horseshoe may be opened or approximated at will.

When employing the instrument, the patient, if in bed, or on the floor, is placed in a horizontal or semi-dorsal position, with the head supported by a cushion beneath the neck, in such a manner as to allow the the cranium to fall slightly backward, thus causing a protrusion of the cervical vertebræ, in an anterior direction. The operator then takes his place at the side of the patient, and proceeds to ascertain by careful exploration the exact location of the carotids. Having accomplished this, he next applies the instrument in such wise that the pads will press the arteries away from the pneumogastric nerves and jugular veins in the direction of the spinal column. By pressing one hand against the posterior portion of the neck, it is possible to execute any amount of counter-pressure. Compression should, however, never be carried to such a degree as to cause entire closure of the lumina of both arteries.

Besides the device just described, I have also had made for me appliances, by the use of which it is possible to employ compression of the carotids for prolonged periods of time, with or without simultaneous

galvanization of the sympathetic and pneumogastric nerves.*

Not only is it possible to arrest the succession of paroxyms peculiar to the *status epilepticus* in the manner above described, but it is also sometimes possible to prevent the occurrence of seizures for weeks together, by maintaining continuous compression of the carotids.†

As an adjunct to the treatment, then, carotid-compression, by the aid of appropriate appliances is a most valuable expedient, especially when combined with the administration of the bromides.

Of these last mentioned remedies it is now necessary to speak. During the last ten or fifteen years the bromides, and especially the bromide of potassium, have been more employed in epilepsy than any other remedies heretofore recommended. In order to produce the best results, it should be given in doses varying from fifteen to forty-five or even fifty grains. Very young children are, however, sometimes benefited by small doses of from six to ten grains. While the potassium salt is preferred by some neurologists, the sodium salt has been praised by others. For my own

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* For a further description, as well as for illustrations showing these appliances, see the New York Medical Journal for February 23, 1884. Also "Brain Rest," by J. Leonard Corning, M. D. Second edition. G. P. Putnam's Sons, New York, 1885.

† The "Medical Record," February 18, 1882.

part, I must confess that I prefer a mixture of these two salts, or still better a solution containing the amonium, the potassium, the sodium and the lithium salts. The following is a simple formula :

℞ Bromide potassii,
Bromide amonii,
Bromide lithii,
Bromide sodii, ää ʒ ij.
Aquæ, ℥ vj.

M.

Dose, from one to four teaspoonsful three times a day.

By the concurrent administration of arsenic the troublesome eruption of acne, which frequently follows the exhibition of the bromides, may sometimes be prevented. The rash having, however, made its appearance, it is well to cut down the dose of the bromides at once, or even to discontinue their administration for a time altogether. During the interim the oxide of zinc may be given in doses of from one to five grains. In this way it is often possible to prevent the recurrence of the attacks, which may easily happen, if the patient is deprived of all medicine for some days.

Where there is a suspicion of syphilis the iodide of potassium should be, of course, at once resorted to. To obtain the best results it should be given in large doses.

CHAPTER XIII.

TREATMENT CONTINUED—EPILEPTIC INSOMNIA.

As disorders of sleep constitute an important feature of almost all forms of functional nervous derangement, it is important to possess some knowledge of this complication, inasmuch as without such knowledge the physician speedily finds that his efforts at amelioration are at once annoying to the patient and barren of results. Before taking up the treatment of that distressing and destructive form of sleeplessness which is such a frequent accompaniment of epilepsy, I desire to say a word or two regarding sleeplessness in general: To begin, then, insomnia may be classified into two principal divisions, primary or idiopathic insomnia and secondary or symptomatic insomnia. By primary insomnia we understand that form of sleeplessness which is directly traceable to some disturbances of the brain itself. This is the variety of insomnia with which we are most frequently concerned in the treatment of epilepsy.

When we speak of secondary insomnia we mean that form of sleeplessness which may be traced to some corporeal disturbance external to the brain itself, but which, acting on the cerebral mechanism through the agency of the centripetal nerves gives rise to a

degree of irritation sufficient to prevent the superven-tion of unconsciousness. The symptoms of both the idiopathic and symptomatic varieties of the affection resemble each other closely, so that a general description is all that is needed.

A person afflicted with insomnia, but otherwise exempt from serious nervous difficulty, complains either that he cannot fall asleep, or that, although he may succeed in maintaining unconsciousness throughout the night his sleep "does him no good," as he is in the habit of expressing it. The first phase of the affection, characterized by difficulty in falling asleep, is familiar to persons who are laboring under great emotional or mental strain, and who carry their business or worry to bed with them. Difficulty of maintaining the condition of unconsciousness, that state in which the patient awakes soon after falling asleep or during the early morning hours,—is frequently encountered among those who are addicted to abuses of the table; while the ability to sleep through the night, and yet to experience scant refreshment from such protracted slumber, represents a pathological condition peculiar to those who are the victims of unconscious cerebration or dreaming or both. Those who are victims of this morbid cerebral condition simply carry on their mental efforts unconsciously, but though laboring thus, all unbeknown to themselves, the consumption of cerebral energy goes on apace, so that there is little or no repose whatever.

Persons who are the victims of this derangement suffer immensely, not the least of their troubles consisting in their total inability to account for the feelings of lassitude which assail them immediately on rising from what they imagine to be a perfect type of sleep.

Besides dreaming and unconscious cerebration, derangements of the liver and kidneys sometimes produce this morning lassitude, and the same may be said of that exhaustion which supervenes npon protracted mental labor, worry, or both combined.

In epileptics, and more especially in those who have become inmates of asylumns in consequence of mental trouble, we encounter an interesting phase of insomnia, which, for most practical reasons is worthy of study.

This variety of insomnia comes on in the first place as the sequence of an attack: the patient awakes from the comatose condition incident to the attack; he is drowsy and may sleep for a considerable length of time, but the same night he is restless and may fail to procure even an hour of sleep, and on the following morning gives unmistakable evidence of having suffered severely from the involuntary vigil.

Sometimes, again, the attack of insomnia comes on with no other warning than an unusual degree of restlessness or irritability. The effects of these enforced vigils in persons afflicted by such a grave disease as epilepsy are often of a most disastrous character.

Sometimes the attack of insomnia is followed by a terrible outburst of maniacal furor, while in a certain number of cases there is a well-marked increase in the number of convulsive seizures. Again, in a milder class of cases, the general health of the patient undergoes rapid deterioration; he becomes irritable and subject to attacks of depression; his complexion becomes sallow; his face assumes a stupid, emotionless expression; he loses flesh, and, in short, falls into a rapid decline, with but one prospect, that of speedy dissolution.

The more I have seen of epilepsy the more have I become convinced of the necessity of treating systematically and promptly this epileptic variety of insomnia. Fortunately, the problem involved is not so difficult as it might appear at first sight. In the first place the patient should be continuously saturated with the bromides, but not bromized. He should be given from thirty to seventy-five grains a day, each dose to be combined with one or two minims of the liquor arsenicalis. Given in this way the bromides many be continued for many years, if need be. In severe cases it may be necessary to increase the dose still further, as we have already seen; but, in a considerable percentage of cases, this dosage will be found sufficient to prevent the attacks, and at the same time to exert a progressively tranquilizing influence upon the cerebrum as night approaches. At bed-time, or shortly before it, twenty or thirty grains of chloral

may be given, combined either with two or three drachms of the tincture of hyoscyamus, or with a drachm of the bromide of potassium.

Several years ago, when I published the first edition of my little book on "Brain Rest," I advocated the seclusion of patients afflicted with insomnia, or for whom prolonged sleep had been prescribed as a feature of treatment, in a darkened room. I can only repeat on this occasion what I then said :

The subject is secluded in a darkened room from ten to fifteen hours at a time, according to the amount of sleep which it is desired shall be had during the twenty-four hours. The amount of sleep is *progressively* increased by habit, moderate medication, and hydrotherapy, and no attempt is made to produce a sudden state of stupor by the reckless use of sedatives. When the patient awakes, as is usually the case, two or even three times during the hours set apart for rest, nourishment is administered, but always in a fluid and easily digested form. Where difficulty is experienced in again falling asleep, resort is had in the beginning to limited medication. The few hours of wakefulness are devoted exclusively to some form of amusement —reading, writing, and even the mildest forms of mental concentration being absolutely prohibited. This, in brief, is the method from which I have already seen most happy results, and from the employment of which I hope and believe much good will in future be derived. It is hardly necessary to say that the prob-

lem of cerebral rest is essentially different and presents many more difficulties than spinal rest. To give repose to the motor cells of the cord is comparatively an easy problem, and one which only exacts a permanent fixation of the motor apparatus for its solution, the consciousness or unconsciousness of the individual being only a matter of secondary importance. Rest, however, for those cells, the function of which is the evolution of mind, can only be obtained by a prolonged period of absolute unconsciousness; and this, as a matter of course, will often tax the patience and resources of the physician to the utmost. Perseverence and the utilization of the principle of habit will usually, however, render essential assistance.

These are the views which I expressed in 1883,* when discussing the most rational method of treating cerebral exhaustion. All that I then said may be properly applied to the treatment of a large number of functional nervous affections, and particularly in the treatment of chorea and epilepsy. So manifestly important is the question of sleep in the treatment of the latter affections, that I trust I have not trespassed too much upon the patience of the reader, by discussing the matter somewhat at length. It has been a matter of great surprise to me that so little attention should heretofore have been bestowed upon this important matter of prolonged sleep in the treatment of

* The New York Medical Journal for December 29, 1883.

convulsive nervous affections. From quite an extensive personal experience both in insane asylum and private practice, I am convinced that the subject is one of superlative importance, when it is a question of restoring derangements of cerebral nutrition, whether such be the concomitants of exhaustive or convulsive conditions.

INDEX.

A.

PAGE.

Amaurosis in Hysteria..... 39
Amblyopia in Hysteria..... 39
Anæsthesia in Hysteria..... 37
Anæthetics..... 12
Hysterical Manifestation Following the Administration of Anæsthetics Generally Occur in Neurotic, Hysterically Inclined Individuals..... 16
Hysterical Phenomena Consequent Upon the Administration of..... 12
Lyman's Cases Illustrating False Beliefs of Women Engendered by the Administration of..... 13
Auræ Epileptical..... 85
Auditory..... 87
Motor..... 88
Olfactory..... 88
Psychical..... 89
Secretory..... 87
Sensory..... 85
Taste..... 88
Vaso-motor..... 86
Visceral..... 88
Visual..... 87

C.

Carotids, Compression of in Epilepsy, Corning's Method of Executing.....159 *et seq.*
Cerebral Rest, Corning's System of Affording..... 167
Contractures in Hysteria..... 45

PAGE.

"Convulsion Center" 131
Convulsions 118
Blood-letting as a Cause of; Pioray on, Kellie on, Marshall Hall on, Sir Astley Cooper on ..... 117 *et seq.*
Brown-Sequard on 133
Challand on 136
Landois on the Relation of Venous Hyperæmia to 129
Magnan on 136
Nothnagel's Researches on 131
Kussmaul and Tenner on the Physiology of, 120 *et seq.*
Westphal on 135

E.

Epilepsy 83
Age in 111
Alcohol in 111
Author's Statistics on the Relative Frequency of in Men and Women 111
Bromides in 161
Brown-Sequard on 133
Carotid-Compression in, Corning's Researches Regarding 159
Causation of 109
Classification of 83
Cooper, Sir Astley, Researches of, on 118
Cranial Injury in 114
Excesses in 112
Experimental Researches on 117
Fever in 113
Gower's Statistics in 111
Heredity in 110

PAGE.

Epilepsy Hippocrates' Views Regarding..... 117
Insomnia of..... 163
Iodide of Potassium in..... 162
Irregular forms of (Masked Epilepsy)..... 99
"Jacksonian"..... 104
Kellie on..... 117
Kussmaul and Tenner on..... 120 *et seq.*
Landois on..... 129
Major Variety of..... 90
Marshall Hall on..... 118
Minor Variety of..... 95
Nothnagel on..... 131
Patho-anatomical Findings in..... 139 *et seq.*
Pioray on..... 117
Prognosis of..... 157
Prolonged Sleep in..... 167
Sensory..... 107
Sex in..... 111
Symptoms of..... 84
Thalamic..... 103
Transition forms of..... 97
Treatment of..... 158 *et seq.*
Westphal on..... 135
Zinc in..... 162
Epileptic Seizure, Mechanism of..... 142
Hughlings Jackson on..... 154
Kussmaul and Tenner on..... 143
Marshall Hall on..... 143
Nothnagel on..... 150
Todd on, "Humoral" Theory of..... 153
"Epileptogenous Zone"..... 134

G.

Globus Hystericus, Galvanism in..... 81
Grand Mal..... 90

H.

Hyperæsthesia in Hysteria..... 25
Hysteria..... 1
Case from Author's Experience Illustrating Morbid Impulse to Commit Violence..... 19
Causation of..... 68
Clauston's Observations on Hysterical Insanity.. 21
Contractures in..... 46
Cough, Peculiar in..... 50
Craving for Sympathy in..... 6
Crimes in..... 7
Deception in..... 6
Definition of..... 1
Diagnosis of..... 72
Hearing, Exaltation of in..... 28
Hyperæsthesia in..... 25
in Children..... 62
in Men 67
Insanity as a Complication of..... 21
Insanity in Case of Clauston Illustrating..... 23
Medico-Legal Relations of, Importance of..... 20
Morbid Impulses to Commit Acts of Violence in, 18
Motive for Violent Acts in not Always Ascertainable..... 20
Motor Disorders in..... 41
Mutilation in. 8
Notoriety or Desire for Sympathy as a Cause of Violent Acts in..... 19
Ovarian Troubles as a Cause of..... 3
Ovaries, Hyperæsthesia of in..... 30
Pain, Morbid Sensibility to in..... 29
Paralysis in..... 44
Paroxysmal Attacks in. 57
Pathology of..... 70

PAGE.

Hysteria, Prognosis of..... 74
Psychical Manifestations of..... 5
Retention in..... 81
Sensory Disorders in..... 25
Sight Exaltation of in..... 27
Smell, Exaltation of Sense of in..... 26
Spasms in..... 41
Taste, Exaltation of in..... 27
Treatment of..... 75
Tremor in..... 47
Vaginismus in, Scanzoni on, Thomas on..... 43
Vaso-motor Disorders in..... 49
Hysterical Attack, The..... 57
Hysterical Cough..... 50
Author's Cases of..... 54
Hartley's Remarkable Cases of..... 51
Synclair's "Acute" Case of..... 56
Hystero-epilepsy..... 58

I.

Insomnia of Epilepsy..... 163
Disastrous Effects of..... 165

J.

"Jacksonian" Epilepsy..... 104
Joints, Painful, in Hysteria..... 33
Brodie, Sir Benjamin on..... 32
Skey on Pain in Joints in Hysteria..... 34

L.

Larvated Epilepsy..... 99

M.

Medico-Legal Relations of Hysteria..... 20

PAGE.

O.

Ophthalmoscopic Appearances, Absence of Characteristic in Hysteria..... 39
Ovaries, Hyperæsthesia of, in Hysteria..... 30

P.

Pain in Hysteria..... 29
Dorsal, in Hysteria..... 31
Morbid Sensitiveness to, in Hysteria..... 29
Ovarian, in Hysteria..... 30
Paralysis in Hysteria..... 44
Petit Mal..... 95

S.

Sensory Disorders of Hysteria..... 25
"Sensory Epilepsy"..... 107
Sir Benjamin Brodie on Painful Joints in Hysteria..... 32
Spasms in Hysteria 41
Suicide, Fictitious Attempts at on the Part of Hysterical Persons..... 16
Case Illustrating Fictitious Attempt at Self-destruction from the Author's Experience..... 17

T.

"Thalamic" Epilepsy..... 103
Tremor in Hysteria..... 47

V.

Vaginismus in Hysteria, Thomas and Scanzoni on..... 43
Violence, Morbid Impulse to Commit Acts of Among the Hysterical..... 18
Visual Disturbances in Hysteria..... 39

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